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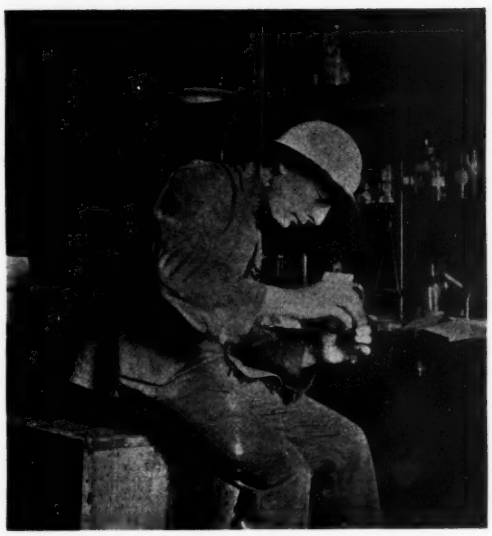
Ficus Elastica and *Castilloa* Latices

Henry P. Stevens [1]

ALTHOUGH for all intents and purposes the *Hevea Braziliensis* or Para rubber tree is the only rubber yielding tree at present cultivated, this was not always the case. Today the words rubber and latex are almost synonymous with Para rubber and Para latex, but there was a time when rubber from other sources was available and the quality of commercial raw rubber showed very large variations.

Hevea Latex an Exceptional Type

Owing to the present predominance of rubber from *Hevea Braziliensis* almost all chemical investigations have been concentrated on the latex from this tree and the rubber therefrom, and a position has been reached which tends to the assumption that *Hevea* latex and rubber are the normal types, while others are abnormal. Thus, as is well known, *Hevea* latex is readily coagulated by a very small addition of an electrolyte and coagulates spontaneously in the country of origin in about 12 or 14 hours unless an antiseptic or preservative be added. It is therefore assumed that a latex which is not readily coagulated by electrolytes or does not coagulate spontaneously is abnormal, while, as a fact, the reverse is the case. If an examination is made of latices of other botanical origin, rich in hydrocarbon, it will be found that the best known of these are not coagulated either spontaneously or with the aid of electrolytes. Consequently it may be concluded that *Hevea* latex is exceptional and abnormal. Unfortunately much of the data in regard to other latices is scanty and unreliable. Only in a few instances have we the records of trained chemists.[2] Most of the information is based on statements of observers without scientific training or at least without adequate chemical experience. Therefore any contribution to our knowledge of latices other than that of *Hevea* is very welcome.



Dr. Henry P. Stevens at Work in 1910 in the Laboratory on an Estate in the Federated Malay States

Comparison as a Source of Rubber

In a recent issue of this journal was published a paper by Daniel, Freundlich, and Söllner on the "Stability of *Ficus Elastica* Latex."[3] However, as some of the statements made and the conclusions reached are not in agreement with my own experience of this latex, it is worth while putting on record certain observations which I made many years ago, with fresh latex on the spot, which have not previously been published. These also provide some additional data bearing on this latex.

In the early plantation days, e.g., up to 1905 or 1910 when the present developments in the Far East were in their infancy, there was no certainty as to the best species of rubber tree to plant. The bias was in favor of *Hevea* as it yielded the Para rubber, the acknowledged best quality of rubber on the market. It is probable, however,

[1] Former consultant to Rubber Growers' Association, London, England.
[2] E. A. Hauser, "Latex, Its Occurrence, Collection, Properties, and Technical Applications," The Chemical Catalog Co., Inc., New York, 1930.
[3] INDIA RUBBER WORLD, July 1, 1938, pp. 31-33, 38.

that not this, but the discovery of wound response was the reason for the survival of *Hevea* as the source of plantation rubber. The *Hevea* yields little or no rubber at first tapping and that of a very viscous nature. After a few days a gradually increasing amount is obtained until at the end of ten days or a fortnight the tree is yielding normally. So far as I am aware no other tree behaves in this manner. The bulk of the latex from other botanical sources is obtained in a few tappings, and the trees are then rested for months before more latex can be obtained. At least this is the view generally held, and I am not aware of any systematic tests on repeated tappings at short intervals. Rubber yielding trees other than *Hevea* suffer from other economical disadvantages; thus the *Manihot* or *Ceara* was found to have a very hard bark or outer layer of cortex which had to be removed before tapping could be begun. With *Ficus* the latex vessels are deeply embedded, many in the wood; consequently deep cuts are required to give an adequate flow. This results in damage in the cambium.

Most of the rubber trees other than *Hevea* which were planted in the early days have now been cut out to make room for the commercially profitable type, but when I visited the Malay peninsula in 1908 I had the opportunity of carrying out some of the first experiments ever made with rubber latex[4] both from *Hevea* and other latex yielding species. These included a row of Rambong *(Ficus elastica)* trees which were available for tapping.

Tapping *Ficus* Trees and Latex Flow

Daniel, Freundlich, and Söllner refer to the behavior of a tree tapped for the latex supplied to them as reported by the manager of an estate. It was stated that the latex oozed freely at first, but quickly thickened and became apparently half coagulated. In my experiments this apparent tendency to coagulate was also noted in one instance. Actually it is not a coagulation in the sense in which this term is used for rubber latex, that is a setting of the whole latex to a gel-like mass of spongy consistency, but a creaming and partial clotting. I find from my notes that as a general rule the latex exuded freely and more quickly than when *Hevea* trees are tapped. The latex appeared to be "thinner," that is, more mobile. On one occasion, however, I observed that the latex was thick and inclined to clot. I have noticed a similar behavior with *Hevea* latex and will refer to this later.

I had the services of a skilled Javanese tapper who had had experience in tapping *Ficus* trees. The cuts he made were deep and somewhat at random or rather in such positions as enabled him to collect the latex more easily, although inevitably a quantity was lost. This arises from the habit of the trees, which like the famous Banyan tree throws out aerial rootlets that take root in the ground and grow to subsidiary trunks. If a herringbone system was adopted as reported by Daniel, was it applied to several trunks or only to the central trunk? A photograph of one of the trees which were tapped for me will be found on page 32 of my little book on rubber.[5] Nothing was added to the latex which I collected in the way of a preservative, as nothing is necessary. *Ficus* latex keeps indefinitely, i.e., does not putrefy, although it creams. The cream may become compacted, and eventually a solid irreversible clot or lump of irregular outline may form in the latex, but much of it, however, remains fluid.

[4] Confidential reports, not published.
[5] "Rubber," published by Sir Isaac Pitman & Sons, London, p. 31, first edition, 1911; p. 35, second edition, 1915; omitted from third edition, 1929; and fourth edition, 1934.

Similarity of *Ficus, Castilloa,* and *Funtumia* Latices

Microscopically examined, the latex is seen to consist of spherical drops. Obviously the hydrocarbon in the latex is a fluid. The same applies to *Castilloa elastica* latex from Mexico, also cultivated at one time on a considerable scale. This latex creams even more rapidly than *Ficus,* and when preserved in a bottle, partial agglomeration of the cream takes place in a manner similar to *Ficus,* resulting in an irreversible and irregular shaped lump or clot. Samples dispatched home may arrive in this condition, and it may be that the clotting is similar to that produced by the churning of milk. Acids have no coagulating effect either on *Castilloa* or *Ficus,* or likewise *Funtumia* or other latices I have come across.

Daniel in the publication already referred to deals at some length with the reason for the non-coagulation of *Ficus elastica* latex with acids and suggests the presence of a natural stabilizer. It might, however, be due to the positive charge on the particles, although in that case the addition of alkalies such as the ammonia would cause coagulation. It will be recalled that the latex examined by Daniel was made alkaline with ammonia before dispatch. The cause of the stability or instability of latices is at present but little understood; thus the effect of the cationic soaps such as cetyl-pyridinium bromide on preserved *Hevea* latex is unexpected. This substance in sufficient quantity reverses the charge on the particles, but small quantities will coagulate preserved *Hevea* latex although insufficient to neutralize the ammonia present. Unfortunately so little work has been done with latices such as that of *Ficus elastica* that there is no record whether the charge on the particles of the fresh latex is positive or negative.

Separation of Rubber from *Ficus* Latex

Ficus rubber is readily obtained by the evaporation of the latex. This may be subjected to a preliminary purification by creaming, which is greatly facilitated by the addition of two or three times its own volume of water. Heating the latex promotes agglomeration, i.e., adhesion of some of the particles with one another to form irreversible irregular-shaped clots.

Alternatively the latex may be coagulated by a polar solvent such as alcohol of sufficient concentration (rectified spirits). The coagulant effect is immediate and probably due to dehydration as less concentrated alcohol is without effect. A higher concentration of alcohol is required to coagulate *Ficus* than *Hevea* latex. It is not possible to adjust the proportion of alcohol to obtain a uniform coagulum on mixing, as coagulation is instantaneous when the alcohol comes in contact with the latex. I am, of course, referring to fresh latex as used on the estate; the imported ammonia treated latex may have behaved differently. It was unfortunate that acting under the impression that *Hevea* latex is typical of rubber latices, ammonia was added to the *Ficus* latex. The ammonia, as Daniel points out, has almost certainly reacted with the "resins," and the nature of the latex has in consequence been considerably altered. Further the latex was obtained at a single first tapping, and for this reason would also be abnormal. Hence the conclusions drawn by these authors as to the nature of *Ficus* latex are open to question, and the experiments require repetition with latex obtained from several tappings and dispatched without ammonia treatment.

The use of ammonia as a preservative for *Hevea* latex

was not introduced till some time after the date of my experiments, and I have no record of the behavior of *Ficus* latex to this reagent. That *Ficus* latex contains any constituent which prevents the coagulation of *Hevea* latex is very unlikely seeing that the former may be coagulated by acetic acid in the ordinary way if first mixed with a small proportion of *Hevea* latex. To obtain rapid and successful coagulation, as with *Hevea* latex alone, the proportion of the latter should be about one-fifth. Smaller proportions as one-tenth or even one-twentieth are effective although the coagulation is delayed. The acid serum from the tank in which *Hevea* latex has been coagulated does not coagulate *Ficus* latex, or not immediately. This would indicate that *Ficus* globules are carried down mechanically when a mixture of the two latices are coagulated with acid.

Ficus Elastica Tree

Properties of *Ficus* Latex

Ficus latex is chalky white in contrast to the slightly cream or "off-color" of *Hevea* latex. The scrap dries down on the trees to a pink hue, and the pared surface of the wood also turns pink. If *Ficus* latex be left to stand exposed to the air in a porcelain dish, creaming and evaporation cause the surface particles to be compacted and a coherent film is formed. Concurrently the surface becomes darker, while underneath the latex is lighter in color, indicating that air is necessary to promote discoloration.

At one time a *Ficus* rubber in crepe form, clean and well prepared, was available on the market, but this rubber was always tinged with a shade of dull pink. It is reasonable to suppose that this discoloration is of a similar character to that noted with *Hevea* latex, although the latter tends to a brown rather than a pink color. When *Hevea* plantation rubber was first produced by coagulating latex with a little acetic acid in soup plates to make the so-called Ceylon biscuits, these were dark brown in color. The pale shade of unsmoked plantation rubber today is the result of care taken to prevent the darkening of the surface of the coagulum by the oxidase naturally present in the latex. This result is obtained by destroying or inhibiting the action of the oxidase by means of a small quantity, say one-third to one-fifth of 1% of sodium bisulphite added to the latex at as early a stage as possible.

Fresh *Ficus* latex has a faintly acid reaction (to neutral limits). The acidity increases with keeping. Thus I found that 100 ccs. of fresh *Ficus* latex required 4 ccs. N/10 NaOH for neutralization as judged by color change in the presence of phenol phthalein; whereas after five days, preserved in a stoppered bottle, it required 45 ccs. That is, the acidity had increased tenfold; but there was no sign of coagulation. *Ficus* latex has a sweet smell which becomes more pronounced on keeping. As the latex contains serum constituents of great variety which might be expected to form suitable food for micro-organisms, it would seem that there must be present a powerfully antiseptic and stabilizing constituent unless the globules are positively charged. On the other hand the increase in acidity is presumably mainly due to lactic acid bacteria as in the case of *Hevea* latex.

Stability of *Ficus* Latex

No doubt misled by the report that *Ficus* latex is thick and partly coagulated when it exudes from the tree, Daniel concludes that it develops stability on keeping and devotes some space to the consideration of the "increase in stability." I have shown that *Ficus* latex is stable from the start. It may increase in stability with time, but there is no evidence either way. Any thickening during collection is due to extraneous and probably accidental factors which we have not sufficient data to assess definitely. I suggest, however, that it may be caused by substances allied to tannic acid present on the surface of the bark. I often noticed a similar phenomenon with *Hevea* latex, particularly on wet mornings when the surface of the bark was damp. The clotting or thickening with *Hevea* was similar to that which could be produced by adding a little tannic acid solution to fresh latex. (Tannic acid does not, by itself, form a compact coagulum with fresh *Hevea* latex.)

To avoid misunderstanding it is necessary to make clear the distinction between the clotting or thickening of latex and coagulation. Clotting or thickening is a form of partial and incomplete coagulation. It is seldom, if ever met with in preserved latex, but is common with natural latex. It is observed when fresh latex coagulates spontaneously. The coagulation is seldom complete. The fluid at one stage has the appearance of curdled or clotted milk. There are lumps of coagulum which, when squeezed, exude uncoagulated latex. The lumps or clots are of varying size; serum may separate in places. Similarly the addition of tannic acid causes a thickening and curdling although no compact coagulum is formed and acid is necessary to recover the rubber.

On the other hand coagulation is generally a gradual process. The whole of the latex sets uniformly to a junket-like mass. This is exactly what happens when latex is coagulated on the plantations. The whole gradually sets like a jelly. For this reason a parallel phenomenon with preserved latex is the setting of heat-sensitized latex, as for instance in the Kaysam process which is sometimes described as the gelling of latex. Occasionally in the literature one meets with the expression "a clean coagulation" which betokens a coagulation that is complete without a residue of uncoagulated particles or small clots.

T.S. and D.R.C. of *Ficus* and *Hevea* Latices

I made a number of determinations of the total solids in *Ficus* latex. Values obtained for the first two or three tappings were slightly in excess of 40%. Figures actually recorded were 40.7%, 40.6%, and 40.3%, with specific gravity 0.975, 0.974, and 0.974. Thus the gravity is very similar to that of a *Hevea* latex of similar total solids capacity. The latex was obtained from about a dozen trees.

Unfortunately I have no record of figures for both total solids and dry rubber content determined on the same sample of *Ficus* latex, but I have two figures for the dry rubber content of other specimens of *Ficus* latex. Two liters of each were coagulated on both occasions with methylated spirits. The coagula were washed, creped, and vacuum dried at a raised temperature. The yields on the two specimens of latex were close, being 27.0% and 26.3% respectively. If these figures be taken in conjunction with those for total solids, we have T.S. less D.R.C. approximately = 13%. That is to say the dry solids in the latex consist of approximately 67½% rubber and 32½% non-rubber hydrocarbons which are removed in the alcoholic serum.

These figures may be compared with parallel ones for *Hevea* latex. Thus a latex having a T.S. of 41.94 gave a D.R.C. of 38.46 with the difference of 3.48, or 91.7% rubber and 8.3% non-rubber hydrocarbons, remaining or removed in the *serum*. (The rubber in both cases contains "resins," etc., so that the amount of rubber hydrocarbon is, of course, rather less). As already pointed out, the specific gravity is of the same order for *Ficus* as for *Hevea*. This is difficult to harmonize with the much larger proportion of serum soluble solids in the *Ficus*. *Abiarana* latex with T.S. 37.1% contains gutta 31.2%, or 84.1% gutta hydrocarbon on T.S.; whereas the *Hevea* sample gave rather more.

Coherence of Latex Particles

Daniel and the others give a table in which they compare the behavior of the latices from *Hevea, Abiarana, Ficus,* and *Jelutong*. I have already pointed out the error respecting the stability of *Ficus* latex which is set out in the top row. The fourth column under the heading, "Behavior under the Influence of an Electric Current," calls for comment. It is stated, regarding *Hevea* latex that, as a distinguishing characteristic the particles form a coherent skin, but this depends on the conditions of the experiment. Thus on reversing the current the particles are loosened and move away toward the other electrode which has now been made the anode.[6] This could not take place if the particles had united to form a coherent skin, although after a time the deposit is said to become sufficiently coherent to be washed clean with a stream of water. Again the particles under certain circumstances are so loosely aggregated that they rise to the surface as a cream. This is, in fact, the principle of the electrodecantation process for concentrating latex.[7] Or again in recent work by Rowe and myself[8] on pressure dialysis it has been noted that the cream freshly formed on the membrane could be redispersed without difficulty, but after some time tends to become denser and less easily dispersed. In fact the coherence between the deposited particles varies with the conditions although it may be that *Hevea* particles cohere more readily than those of other latices.

I remember a particularly striking example regarding *Castilloa* latex. At the Rubber Exhibition in London in 1908 centrifugal machines were exhibited for separating the rubber as a cream from this latex. They were relatively slow-speed machines consisting of an annular space for the latex formed by the inner surface of a drum and the outer surface of an inner cylinder, a cotton cloth being wrapped around the outer surface of the inner cylinder on which the latex particles were deposited. I took away with me a piece of this cloth with the deposit of latex cream upon it. When hung in air it was dry in a few hours although perhaps ¼-inch thick. If, however, the deposit of cream were gently pressed with the fingers before hanging, the drying took some days instead of hours. It would seem that the *Castilloa* globules were so lightly compacted in the directly deposited cream that the moisture between them could readily evaporate from the interstices of presumably what was a porous structure, whereas, after compressing, the water was locked into the wet mass and could only evaporate by slow diffusion through the rubber itself.

Incidentally it would be interesting to discover how far the coherence of deposited particles, whether deposited electrically or mechanically, is to be regarded as a coagulation in the usual sense of the word. It cannot be a coagulation as ordinarily understood if produced mechanically for there is no electrolyte or coagulating ion present. It has, however, been assumed that when latex is subjected to an electric current, the positively charged ions migrate from the anode surface under the influence of the electric potential, and meeting the negatively charged ions cause coagulation.[9] But if this were the case, reversibility of the deposited particles by altering the direction of the current would not be possible as the particles would be already in contact with and adherent to each other and the anode surface. Or would it be possible to separate the particles as a cream electrophoretically. If the particles were actually coagulated on the surface of the anode by the action of the liberated ions, then we have a simple explanation of the difference between *Hevea* and *Ficus* latices as the former is and the latter is not coagulable by electrolytes. As it stands, the most that can be said is that the particles are at first deposited loosely, but that as the action continues, those first deposited and nearest the anode surface become compacted and are no longer removable by mechanical or electrical means. This gradual coherence of the particles may be caused merely by close mechanical contact or by an electrical discharge, but in the latter case there is no explanation of the delay. Coagulation by the ions on discharge at the surface of the electrode would be instantaneous.

Creaming of *Ficus* Latex

Under "Density of Particles and Coagulum,"[10] it is stated that *Ficus* latex particles are fractionated to a lighter and heavier layer. This may have been the case with the ammonia-treated latex with which the authors worked, but I have no note of any such separation with fresh untreated *Ficus* latex. As stated, this latex creams fairly readily, though not so readily as *Castilloa* latex. When diluted with water, it creams very readily, yielding only two layers, an upper layer of cream and an under layer substantially clear.

Cause of Pink Coloration

The authors also suggest the pink color is due to alkaline decomposition of sugars.[10] Having regard to the fact that the color deepens on exposure to air and particularly in the presence of weak acid and becomes very dark in a few days, it would seem much more likely that it is due to an oxidase or peroxidase such as is found in *Hevea* latex and in a very large number of vegetable tissues as that of the apple and the fleshy coverings of walnuts.

Notes on *Castilloa* Latex

My notebook also contains a few rough observations

(*Continued on page* 42)

[6] P. Klein, *Trans. Inst. Rubber Ind.*, 4, 347 (1928).
[7] Schmidt and Stamberger, *Rubber Chem. Tech.*, 11, 479 (1938).
[8] Stevens and Rowe, *J. Soc. Chem. Ind.*, Mar., 1939, pp. 116-22; also Stevens, Dyer, and Rowe, *J. Soc. Chem. Ind.*, 56, 397 (1937).
[9] C. F. Flint, "The Chemistry and Technology of Rubber Latex," published by D. Van Nostrand Co., Inc., New York, 1938, p. 402.
[10] India Rubber World, Jul'y 1, 1938, p. 33.

Colloidal Graphite Lubricants for Rubber

B. H. Porter[1]

WHILE automobile manufacturers have not recognized officially the necessity of the lubrication of numerous rubber parts in automobiles, a recent survey of the service industry reveals that squeaking rubber parts are troublesome and cause complaints that are relieved only temporarily by spraying brake fluid on the offending points. The solution of this problem is being met through the recent development of suitable dispersions of colloidal graphite. These lubricants are also finding application in the treatment of metal molds to provide a desirable parting action in the production of tires and other molded rubber goods.

Lubricant Compounding

The behavior of colloidal graphite as a lubricant, which depends upon its inherent physical and chemical properties, may be briefly summarized as follows: the minute particles of graphite permit long-time suspension in many fluids including glycerine and water; this particle size also allows passage without separation to any point the fluid carrier penetrates, thus permitting the lubrication of tightly fitting and remote parts; the colloidal graphite embeds itself physically in the friction faces, forming a tenacious, dry, lubricating film, the influence of which prevails after the carrier has been consumed; being chemically inert, the graphite combines in no way with adjacent fluids or parts.

Glycerine also has the following characteristics desirable in a rubber lubricant: prevents quick drying; keeps lubricated parts moist and free from squeaks; lowers freezing point, allowing efficient cold weather use; increases viscosity, adding to ease of application; increases retention of graphite on lubricated parts. Equally important, glycerine exerts no undesired influences on rubber. The successful use of rubber marine bearings has proved the merits of water as a lubricant for rubber.

We have, then, three possible ingredients, the successful blending of which constitutes an effective rubber lubricant: viz., colloidal graphite, water, and glycerine. Only recently these have been blended in suitable proportions.[2] The graphite solids for these formulas are obtained from "Aquadag," (colloidal graphite in water); "Prodag," (semi-colloidal graphite in water); and "Glydag," (colloidal graphite in glycerine).

Wherever in industrial problems the presence of glycerine is objectionable, dilute solutions (one to ten) of colloidal graphite in water alone are beneficial. Frequently a small quantity of soap solution is added to improve wettability. Both the patented formula and this plain graphite mixture are applied with brushes, spray guns, oil cans, or needle sprays.

Purpose and Method of Application

Lubrication is required by many automobile parts including spring shackles, sway eliminator bars, steering columns, shock absorber arms, spring pads, and fan belts. Rubber is also used in weigh bar bearings, trunnions, axle spring seats, motor mountings, silence strips, body mountings, and bushings. All such parts may be well lubricated and kept from squeaking by the colloidal graphite-glycerine lubricant mentioned.

Apart from these effects there is a desirable parting action that can also be obtained from graphite dispersions. The production of tires and mechanical rubber goods, for example, requires a parting compound to enable easy and complete separation of the article from the mold.

In this instance molds, watch-case vulcanizers, or the like, are freed of greasy substances with caustic soda solution. Pre-heating usually facilitates this process though in some instances no cleansing whatever is advisable. One part by volume of semi-colloidal graphite dispersion with seven to ten parts of water is then applied to the mold faces with an ordinary paint brush or spray gun. Care is exercised that the surfaces are covered thoroughly. When they are not readily wetted, a small quantity of acetone, ammonia, or sodium oleate is added to decrease surface tension. When the coating is thoroughly dried, it is puffed lightly with a soft cloth or brush, care being taken that the surface is not scratched in the process. After the first coat no further polishing is necessary as the movement of the rubber is sufficient to puff and also rub the fine graphite into the pores.

Experience shows that such a coating will last for about four cures; the exact number possible with each film and solution density is dependent entirely on the rubber compound and the temperature or time used in curing. After the first few cures the mold is re-coated with a more dilute solution. Generally, a practical application consists of the following schedule of solutions of semi-colloidal graphite in water with the proportions by volume:

A. One part graphite in 10 parts water: 4 to 6 cures.
B. One part graphite in 20 parts water: 10 to 12 cures.
C. One part graphite in 25 parts water: for succeeding cures, treating the mold once each day. If a low grade of rubber is used with high temperatures and long cures, the solution should be more dense and the mold treated more often.

Soap and tan bark are added frequently to semi-colloidal graphite mixtures for the treatment of steel molds, the dilution being one part graphite to 20 parts of soap-tan bark solution. If iron molds are used, the semi-colloidal graphite dispersion is diluted with ten parts of this solution and applied by spraying.

Wherever metallic surfaces contact vulcanized rubber in service, the surface of both components is coated advantageously with colloidal graphite in water for purposes of dry lubrication. One part of this preparation, as commercially available, is diluted with two or three parts of water

(*Continued on page* 42)

[1] Physicist, Acheson Colloid Corp., Port Huron, Mich.
[2] U. S. patent No. 2,083,176.

Japanese Financial Stringency Influences Trade in Rubber

Foreign Consumption of Scrap Rubber Assumes Increasing Proportions

THE Japanese rubber industry, prior to outbreak of hostilities in China, was using about 60,000 tons of crude rubber annually, in addition to available local supplies of scrap rubber supplemented by imports of about 1,000 tons of scrap rubber yearly. The effect of the increasing financial stringency has been such that during 1939 it is probable that Japan may import more scrap rubber than any other country in the world, while under strict Government supervision and control the imports of crude rubber are being limited to 35,000 tons. Most of the scrap rubber imports will come from the United States; at the average rate of American shipments to Japan for the four months ended February, 1939, the total for 1939 would aggregate 17,500 tons—and the rate of shipments has steadily increased during these months.

The steps leading to this change have, of course, been gradual. At first Tokyo authorities limited their control over rubber to mild measures, while control organization was being perfected. Then the production of certain goods for domestic use was prohibited, and the distribution of rubber to manufacturers was placed under strict supervision. This was accompanied by efforts to stimulate domestic production of synthetic rubber, and during the past two years there has been a ceaseless flow of rumored new synthetic rubber discoveries by Japanese firms and individuals. It is significant, however, that a 10,000 yen prize offered by the Government for a successful process of making synthetic rubber has not been awarded. Commentators observe that the processes described in these "new discoveries" often parallel those set forth in the patent specifications under which Neoprene is produced by E. I. du Pont at Wilmington, which are, of course, generally available although their use for production purposes is legally protected.

In 1938, Japanese rubber imports were severely restricted, to conserve finances, the Government in advance specifying 45,000 as the total for the year: actual imports amounted to 46,307 tons. Although Japanese exports of rubber products declined 33% in 1938, partly because of widespread unpopularity of their campaign in China and boycotts among distributers and consumers, this restriction resulted in a severe shortage of rubber supplies within Japan, and there has been almost a tire famine. Imports of scrap rubber have meantime increased from 1,870,000 pounds in 1935 to 5,045,000 in 1936, to 11,040,000 in 1937, and to slightly above 12,000,000 pounds in 1938 when total United States shipments to Japan (heaviest in the last two months of the year) amounted to 16,634,000 pounds. This year, with crude rubber imports further reduced to 35,000 tons, the scrap rubber total appears likely to range between 40 and 50 million pounds, i.e., over 20,000 long tons. The Japanese are going into larger-scale reclaimed rubber production; in 1938 their reclaim production is estimated at 15,000 tons.

The estimate for 1939 scrap rubber imports is not very imposing taken by itself, although it is so tremendous in comparison with previous Japanese imports. There is, however, but one country in the world that has ever imported an equal quantity of scrap rubber in a single year. The United States, leading importer of scrap rubber prior to 1920, never imported 20,000 long tons of the material in any twelve-month period, although that figure was closely approached in the year ended June, 1913; in recent years American imports have been small, and our nation has become the principal source of exports. Until recent years Germany never imported even 20,000,000 pounds a year, but in 1936 the total was nearly 23,000,000, in 1937 about 90,000,000, and in 1938 about 36,000,000 pounds—the 1937 figure being the world record. In 1929, France had peak imports of nearly 35,000,000 pounds of scrap rubber, and in 1935, Spain had her peak imports of about 34,200,000 pounds. France, like the United States, has used scrap rubber chiefly for production of reclaimed rubber; Spain has used the old tires, cut to convenient lengths, in the direct production of low-priced durable footwear, the industry centering at Barcelona. Italy never imported more than 10 million pounds of scrap rubber until 1938, when imports increased sharply to 20,295,000 pounds. There are possibilities that Germany and Italy have used scrap rubber in connection with building up a crude rubber inventory, but indications so far are that Japan is buying the material to reclaim and use with the limited supplies of crude rubber imported so as to eke out the materials necessary to support her domestic rubber manufacturing industry. Scrap rubber has been selling for export to Japan at about 1⅓¢ a pound in recent months, while the crude rubber market price is above 16¢; the intrinsic value of scrap rubber (after being reclaimed) is far higher in relation to crude rubber than this price comparison would indicate. The financial saving through increased use of scrap rubber becomes apparent when the cost of reclaiming (say, around 3¢ per pound) is taken into consideration.

China has in past years been a more important buyer of scrap rubber than Japan. Probably as much or more scrap rubber than crude rubber has been imported into China and Hong Kong together during the 1930-1938 period, the aggregate for scrap being reported at 28,895,000 for the peak year 1935, and estimated at above 20,000,000 pounds in both 1937 and 1938. The end of the Chinese conflict would probably eventually result in

(*Continued on page* 43)

Rubber Tired Farm Vehicles

Warren S. Lockwood[1]

IN THE United States the equipping of farm tractors with rubber tires has progressed to the point where the movement will continue to expand through its own momentum. In view of the greater number of haulage vehicles and implements, the use of pneumatic tires on these types of farm equipment offers an even more fertile field for increasing the consumption of rubber. Because of the greater attention which has been given to rubberizing accessory farm tools in foreign countries, this discussion will serve as a stimulus toward concentration on this comparatively new and undeveloped field of great potential importance in this country.

THE March 1 issue of the INDIA RUBBER WORLD[2] quoted Alexander Hay, well-known British agricultural engineer, as having recently commented that, "The two outstanding developments of recent years in the farm equipment industry have been the introduction of the pneumatic tire for farm tractors in the United States of America and the adoption of the land tire for horse-drawn vehicles on farms in Great Britain. Both these innovations have led to a greater degree of elasticity in farm management methods by increasing the range of tractor work and transport on the farm."

In this country, both tractor and tire manufacturers, as well as farmer customers, fully recognize the economic merits of the rubber tired tractor. As a matter of fact it is perhaps true that the development departments of both rubber and implement companies have concentrated so intently on improving the efficiency of tractor tire design, and adapting the tractor itself to the higher speeds and greater flexibility made possible by rubber tires, that too little attention has been devoted to improving farm transport vehicles. There is a great gap between the farm truck and the farm wagon which remains to be filled by new types of rubber equipped two- and four-wheel trailers. The rubber tired farm vehicle in a remarkably short space of time has made obsolete the old-type four-wheel wagon and at the same time rendered possible a new farm transportation unit which, behind high-speed tractors, can effectively supplement the farm truck on large-scale farms and can handle with greater economy the hauling requirements of smaller farms still in the horse-drawn stage.

Experience in Foreign Countries

Mr. Hay indicated the stress being placed on the rubber tired farm wagon in England. The progress made there, and in other continental countries, in rapidly converting old-type farm vehicles to rubber equipped units is most impressive. Those concerns in England, both tire and agricultural equipment, which have played a leading part in this transformation are more than enthusiastic concerning the development. A prominent British tire company which has pioneered this field with every scientific resource at its command, for instance, claims that, "The many advantages and economies claimed for Pneumatic Equipment have been fully tested under varying conditions, in all parts of the world, and it is agreed that it represents the greatest development ever made in animal-drawn transport."

The leading farm cart and wagon manufacturing organization in Great Britain, which, incidentally, now produces all of its farm carts and wagons on rubber tires, claims in a descriptive folder of its vehicles that, "The application of the pneumatic tire to horse-drawn vehicles is the most progressive innovation of modern times and has revolutionized road and land cartage. It marks a new and important era of lower costs and increased efficiency."

Lest one imagine that such impressions are limited to the imagination of those who stand to profit from the development, it might be of interest to note that numerous unbiased scientific observers abroad have extravagantly praised rubber tired farm wagons.

For instance, Dr. C. H. Dencker, director of the Institute of Agricultural Engineering, University of Berlin, wrote in 1936, "It is, however, hardly possible to discuss the advantages of the pneumatic tire tractor without at the same time mentioning the pneumatically tired field wagon which all of a sudden diminished all haulage operations to an extraordinary degree. The two, i.e., rubber tired wagon and rubber tired tractor, are inseparable, and large, progressive establishments cannot today be conceived without them. They have made true the dream—hitherto regarded as unrealizable—to cope with the maximum peak work, and thus to dispose with the 'peak horses,' which are only kept for these brief months."

In Germany it has been estimated that 90% of the new farm wagons currently manufactured are equipped with rubber tires, and in Great Britain the figure is probably more nearly 95%.

Scientific tests have been made at responsible agricultural engineering stations in the British Empire showing the advantages of pneumatic equipment in relation to drawbar pull. Of these perhaps the best known and most widely quoted is the University of Reading test conducted at Sonning-on-Thames, England, early in 1937. The results of this test are summarized in the table on the following page.

Earlier tests at Oxford showed reductions in draft of a farm cart fitted with pneumatic tires, compared with the same cart carrying the same load on iron wheels, varying from 13% to 41%, according to the load carried

[1] Director, Crude Rubber Development Bureau, Munsey Bldg., Washington, D. C.

[2] "Rubber Tired Farm Tractors," Warren S. Lockwood, Mar. 1, 1939, p. 43.

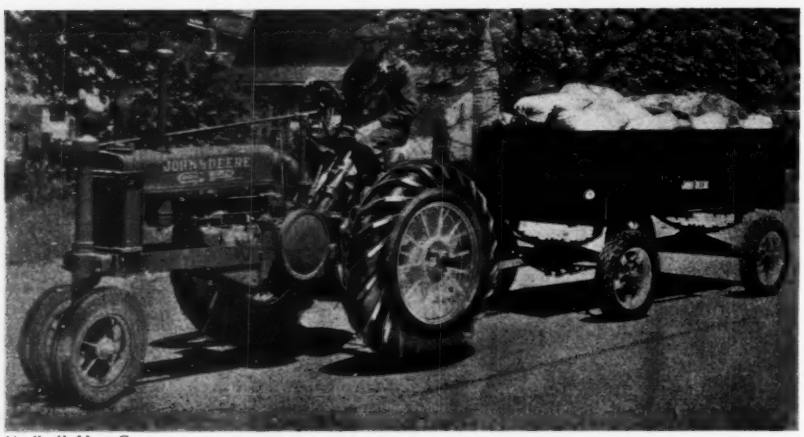
Type of Cart	Average Drawbar Pull Registered on Dynamometer Lbs.	H.P. Required Calculated at Assumed Speed of 1½ Miles per Hour	Average Drawbar Pull Registered on Dynamometer Lbs.	H.P. Required Calculated at Assumed Speed of 1½ Miles per Hour
	Over Grass		Over Soft Ground	
Test No. 1*				
A. Wheels with iron tires	275	1.1	475	1.9
B. Wheels with pneumatic tires and no roller bearings	175	.7	350	1.4
C. Pneumatic tires and roller bearings	150	.6	350	1.4
Test No. 2*				
A. Ordinary farm cart, with iron tires, 3½-inch rims	275	1.1	475	1.9
B. Box cart with pneumatic tires.	150	.6	350	1.4
C. Low loading box cart with pneumatic tires	175	.7	300	1.2

*All tests were with horse-drawn carts with a uniform load of 1,750 pounds.

and type of land traversed. Increases in loads carried for the same draft made possible through the use of rubber tires varied from 35% to 108%, according to ground conditions. Similar studies have been made in the Dominions, with particular research carried out in India, where rubber tires have been found especially helpful for bullock carts. In India today ancient bullock carts, the design of which has changed little in centuries, are now being adapted by the thousands to rubber tires, and many Indian provincial governments are encouraging the changeover by either abolishing or reducing road taxes on bullock carts with rubber tires, and even by giving away in certain provinces large numbers of rubber tired carts free to native owners as a means of reducing road upkeep. In India, for agricultural transport purposes, it is frequently much too costly to maintain roads which could be dignified as such, and one of the real advantages of the rubber tired bullock cart is that it provides equipment especially adapted to transport purposes on rough fields, particularly under very wet conditions, and on farm and country roads.

Firestone Tire & Rubber Co.

Picking and Husking Corn in National Contest near Sioux Falls, S. D.



U. S. Rubber Co.

Rubber Tired Wagon and Tractor for Road Haulage

C. Kuijper, agricultural engineer of the Rubber-Stichting, Amsterdam, recently wrote an article featuring pneumatic tired farm wagons in which he states, "Carts on pneumatic tires run very smoothly. That is actually the essence of all the advantages. First of all, light running, as compared with old-fashioned wagons, means economy of haulage. Often, therefore, one horse will suffice where two would otherwise be needed. With the same team, moreover, more can be loaded on to a cart on pneumatic tires and, therefore, more work can be done in a day. Industries whose products have to travel long distances cannot fail to benefit by the higher speed of carts so fitted. . . . It is not enough to replace the old-fashioned wheels by wheels with pneumatic tires. Efficiency can be furthered by modernizing the whole shape of the wagons, for one thing by reducing the weight of the vehicle itself. Cooperation should be stimulated between tire manufacturers, on the one hand, and cartwrights, on the other, in an endeavor to devise a more efficient form of farm cart; to this the agricultural societies might lend very useful support. It is also very important that official agricultural institutions, advisers on agricultural matters, testing stations for agricultural machinery and implements, such as exist in various countries, should likewise cooperate. The result will undoubtedly be the elimination of a large number of antiquated types of cart and the design of a small number of models for various purposes."

Developments in the United States

The opportunity rubber tires give to re-design farm vehicles is of the utmost importance in the United States. Many people in this country who have heard of the remarkable development of rubber tired farm vehicles abroad inquire whether conditions in England, Germany, and other European countries are not very different from this country where the farm truck fills a much greater share of total agricultural

hauling needs. This point is well taken, but it overlooks the fact that there are still in excess of 15 million horses and mules on American farms, and a very large proportion of our farmers are in the part-animal, part-tractor power stage where an improved farm wagon-trailer unit is particularly needed. Recently agricultural experiment stations in various parts of the country are recognizing this need, and several articles have been published showing farmers how to convert existing wagons to rubber equipped ones by using old 6.00 by 16 automobile tires and 6.00 by 20 truck tires.

E. C. Sauve, of the Michigan Agricultural Experiment station, in the November, 1938, bulletin

H. E. Babcock, Jr., Ithaca, N. Y.

Farm Trailer with Front End Supported by Tractor

Goodyear Tire & Rubber Co.

Five-Trailer Farm Train on Rubber

of that station, wrote a particularly detailed article on "The Rubber Tired Farm Wagon," which begins as follows, "The application of pneumatic tires to tractors and, more recently, to a number of field machines has demonstrated beyond doubt a greater efficiency as related to rolling resistance than is possible with the conventional steel wheel. As a result, many farmers have converted their farm wagons or have built wagons of automobile and truck parts to place them on pneumatic tires. Many inquiries have been received by Michigan State College for plans to assist farmers in making these conversions. . . . "

Ohio State, back in 1935, made a very careful test along the lines of the Reading test and recently, at the request of the Crude Rubber Development Bureau, converted the data secured into the following convenient table showing horse power required for animal-drawn vehicles equipped with low-pressure tires compared with steel wheels and high-pressure tires, under varying soil conditions:

DISTANCE, 100 FT. SPEED, 2½ MILES PER HOUR. LOAD, 5,000 POUNDS

Tire	Time Secs.	Lbs. Pull	H.P. Developed	Tractive Surface
28"-34"x5" Steel.....	26.25	418.30	2.906	Meadow
28"-34"x5" Steel.....	27.15	1,175.00	7.760	Cultivated soil
28"-34"x5" Steel.....	27.25	174.75	1.166	Cinders
28"-34"x5" Steel.....	26.75	191.00	1.300	Gravel
28"-34"x5" Steel.....	27.75	35.00	0.226	Concrete
28"-34"x6" Steel.....	27.00	393.35	2.650	Meadow
28"-34"x6" Steel.....	29.45	1,295.50	8.000	Cultivated soil
28"-34"x6" Steel.....	27.05	188.00	1.265	Cinders
28"-34"x6" Steel.....	27.00	207.55	1.400	Gravel
28"-34"x6" Steel.....	27.30	45.75	0.305	Concrete
30"x5.00" High-Pressure..	26.20	190.50	1.320	Meadow
30"x5.00" High-Pressure..	27.50	885.00	5.860	Cultivated soil
30"x5.00" High-Pressure..	27.50	75.25	0.498	Cinders
30"x5.00" High-Pressure..	26.25	107.85	0.747	Gravel
30"x5.00" High-Pressure..	27.00	54.25	0.366	Concrete
30"x6.00" Solid Cushion...	26.30	260.20	1.800	Meadow
30"x6.00" Solid Cushion...	26.20	1,029.00	7.140	Cultivated soil
30"x6.00" Solid Cushion...	27.15	108.50	0.730	Cinders
30"x6.00" Solid Cushion...	26.60	120.20	0.822	Gravel
30"x6.00" Solid Cushion...	27.50	76.75	0.507	Concrete
31"x7.50" Low-Pressure...	25.85	159.50	1.115	Meadow
31"x7.50" Low-Pressure...	27.00	596.00	4.030	Cultivated soil
31"x7.50" Low-Pressure...	27.40	61.10	0.450	Cinders
31"x7.50" Low-Pressure...	26.55	58.70	0.400	Gravel
31"x7.50" Low-Pressure...	27.00	43.45	0.292	Concrete

There is now a growing consciousness of the fact that farm vehicles with rubber tires can be scientifically adapted to meet the hauling requirements of the varied agriculture in different sections of the country. Out in the corn belt, for instance, there has been much recent interest in the use of four-wheel rubber tired vehicles operating as a chain of trailers, usually three, behind mechanical corn pickers.

Farmers' Bulletin #1816, "Mechanizing the Corn Harvest," issued by the U. S. Department of Agriculture, discusses two time records of corn harvesting in 1937, and comments, "The picker used in making both of these records was a two-row machine mounted on a rubber tired, general purpose tractor. The wagons had rubber tires, were equipped with telescoping tongues and had capacity of 40 bushels of ear corn each."

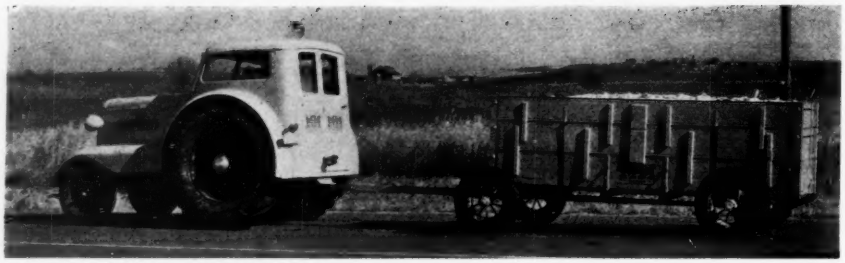
Circular #488 of the U. S. Department of Agriculture, "Developments in Mechanical Equipment and Methods in Sugar-Beet Production," discussing sugar-beet production problems in Colorado and California, under a section headed "Hauling," comments, "The disadvantage, aside from slow speed, of the horse-drawn beet wagon has been the heavy draft caused by the wheels cutting into the soft field. In an attempt to gain the advantages and eliminate the disadvantages of horses for hauling beets, the combination trailer and farm wagon is used. It is equipped with truck-sized pneumatic tires which have much less rolling resistance in the field and permit high-speed highway travel. . . . "

An even more striking example of the adaptation of a rubber tired vehicle to meet purely local agricultural conditions is in the Louisiana sugar cane belt where sugar plantation owners are securing rubber equipment to replace their old cane carts with amazing rapidity. The following extract from a communication from one of the leading agricultural implement dealers in the State of Louisiana serves to emphasize this point:

"It is only a question of time, and a short time, at that, until all tractors and all wagons used in transporting sugar cane will be done on rubber tired equipment. I don't believe there is a single, modern, cultivating tractor in the sugar belt today that isn't rubber equipped. A million dollars have been spent for rubber tired cane wagons in the past few years here in Louisiana, in this small area, where sugar cane is grown. In fact, every rubber tired tractor is equipped with two (2) rubber tired wagons, and I believe this is almost universally true.

"I can quote exact figures from our own operations, and I believe the other companies are equipped to practically the extent that we are. We have one thousand (1,000)

of our tractors out in about fourteen (14) parishes here in south Louisiana all rubber equipped with Hi Lug Rubber Tires, and each Tractor has two (2) Rubber Tired Cane Wagons equipped with 9.00 - 36 6 ply Tires, and even the mule drawn wagons are being rapidly converted into rubber tired wagons as it has been proven that two (2) mules will haul just as much cane per load, and with more ease, on a rubber tired wagon, than four (4) mules will haul the corresponding tonnage with the old-style steel tired equipped wagon."



Minneapolis-Moline Power Implement Co.

High-Speed Tractor and Farm Wagon

According to a National Research Project of the Works Progress Administration, "Tractors, Trucks and Automobiles," which appeared recently, "Improved roads and the possibility of higher speeds suggest that the rubber-tired tractor may become a competitor of the truck for short hauls of heavy loads. . . . Unless hindered by some artificial influence, such as licenses, local taxes, and trailer laws, it is entirely possible that the farm tractor may develop into a combination machine which, with a suitable trailer, will accomplish on many farms much of the work now done by both the truck and the tractor. Such a development was attempted about 25 years ago but failed, among other reasons, for lack of suitable tractor equipment such as is now available in the low-pressure pneumatic tire."

R. B. Gray, Chief, Division of Mechanical Equipment, Bureau of Agricultural Engineering, U. S. Department of Agriculture, writes that, "In place of using a motor truck for hauling, a low-cost rubber tired trailer can be substituted and his tractor used to pull it."

Many college agricultural engineers who have studied the effect of rubber tires on agricultural transport are of the opinion that one of the most important developments of the future will be the designing of improved two-wheel farm vehicles which can be readily adapted for use behind both animal and tractor power. The use of the two-wheel trailer on American farms seems only in its infancy. The advantages of the two-wheel trailer compared with the old-type four-wheel wagon are manifold, in addition to the much lower cost of two compared with four wheels.

Recently the J. I. Case Co. developed a two-wheel rubber tired spreader which was one of the features of the Thirty-sixth Annual Western Tractor and Farm Equipment Show held at Wichita, Kansas, early this year. In a circular describing this spreader, under a heading "Only Two Wheels Give Many Advantages," the company contends:

"Greatly simplified construction is made possible by using only two main wheels. The spreader axle is set well forward of the rear end, and the load is almost balanced on the two wheels. This, together with the close hitch, makes a spreader that is as easy to handle as a two-wheel cart—a convenience that will be greatly appreciated in small barnyards and other places where quick, short turns are necessary.

"Pneumatic tires (7.50x24) permit fast transportation between barn and field, reduce vibration and shocks (easier on spreader and operator), allow spreader to be used over difficult ground conditions and in soft soil, all of which make easier pulling."

Much of the same reasoning applies to the two-wheel rubber tired trailer. In 1935 the total registration of trailers, including farm trailers, was 84,000; in 1937 the figure was 1,019,985. By 1940 the real boom, due to rubber for farm trailers, will be on.

Summary of Advantages

The rubber tire, of course, flattens out under load, and the area over which a given load is carried is considerably increased. Consequently with low-pressure tires a much heavier load can be carried with the same pulling power. It is no exaggeration to state that normally one horse, mule, or other animal can readily pull on rubber what would require a team on steel.

Although the advantages of rubber tired farm vehicles compared with the rapidly antiquated steel wheeled vehicles are many, and perhaps rather obvious, a listing of some of the more important features, in addition to those discussed above, might serve to emphasize the real importance of this whole development:

1. Ground which cannot be traversed with iron wheeled wagons is easily crossed on rubber tires. Swamp and sandy conditions are readily conquered.
2. Larger loads can be carried smoothly and speedily, with particular advantage in the handling of perishable products, livestock, etc.
3. Wheel maintenance charges are reduced, and the wagon itself is protected from the bad effects of jolts and jars.
4. The ground and grass or other cover crops are not damaged as ruts are not formed.
5. Such equipment provides incomparably more comfort for the driver.
6. New and improved designs of wagons of lighter construction and larger capacity, incorporating a lower loading line, are practicable.
7. The farm wagon can be readily converted to a tractor trailer.

The last point is very important in view of the large number of farmers now operating their farms by animal power, who can soon afford the benefits of mechanization because of the low priced, so-called "baby," rubber tired tractors now being marketed.

Rubber-Lacquer-Coated Fabrics

For many purposes there is a very definite trend from straight pyroxylin coated fabrics to a coating of rubber with a lacquered surface. In the case of a chair or a table top where the fabric is supported rigidly, the pyroxylin finish is reported to answer the purpose in excellent fashion. However in the case of spring cushions as automobile seats and upholstered furniture the pyroxylin materials fail quickly because of insufficient resistance to cracking on constant flexing. A rubberized fabric plus a properly designed lacquer will outlast a straight pyrozylin fabric many times over in instances where flexing is necessary.

Patent Abstracts

THE following group of patents is generally chemical in nature and, although not closely related, disclosed important recent developments in their respective branches of rubber technology. The first patent describes a process for finishing continuous-length rubber articles by means of a solution containing an active halogen substance. The second deals with the production of improved rubber substitutes from vegetable oil polymers and glycerine; while another patent presents a method for rapidly producing oxidized rubber products without the use of a solvent. The fourth patent discloses how to produce from chlorinated rubber and chlorinated paraffin wax, non-inflammable plastic products for use as floor coverings or molding powders.

Halogen Surface Finish[1]

A solution containing an active halogen ingredient imparts a permanent surface finish to rubber products that are in the form of continuous sheets, tapes, threads, or cords. The finish, which is integral with the rubber, is said to offer a smooth, dull, satiny appearance. It will not pick up dust readily, is not easily marred, and has a "non-draggy" feeling to the touch. It is claimed that the process is rapid and comparatively inexpensive, producing a consistently uniform finish with minimum attention from the operator.

The solution may contain free halogen, such as bromine, chlorine, or iodine, or a halogen compound, such as sulphur chloride or bromide. A non-aqueous solution of bromine or sulphur monochloride is preferred. The concentration of the active halogen depends upon the rubber composition and the time of contact between the rubber article and solution. The solvent should be inert to the halogen used and should evaporate at temperatures non-harmful to rubber. Also, it should have no deleterious effect on the rubber. Carbon tetrachloride is preferred because it fulfills the above requirements and, in addition, is non-inflammable and comparatively inexpensive.

In the accompanying diagram 1 is a pay-off reel from which a rubber-covered conductor 2, is passed over pulley 3 and power-driven capstans 4 and 4′, and then through a U-shaped vessel 5 of ceramic or other suitable corrosion-resistant material, which contains a carbon tetrachloride solution 6 of bromine or sulphur monochloride. A glass bottle 7 contains a like solution 8, but which is substantially more concentrated in active halogen substance. This bottle is situated above the U-shaped vessel 5 so as to provide gravity flow through the outlet tube 9; the valve 10 provides a means for regulating the rate of flow so as to maintain the volume of solution 6 practically constant. After the rubber-covered conductor leaves the vessel 5, it passes upward and over pulley 11 and is wound on take-up reel 12. The length of travel of the conductor is such as to expose it to the atmosphere for a period of time sufficient to free it of solvent. To hasten the drying operation the treated article may be passed through a closed, heated gaseous atmosphere.

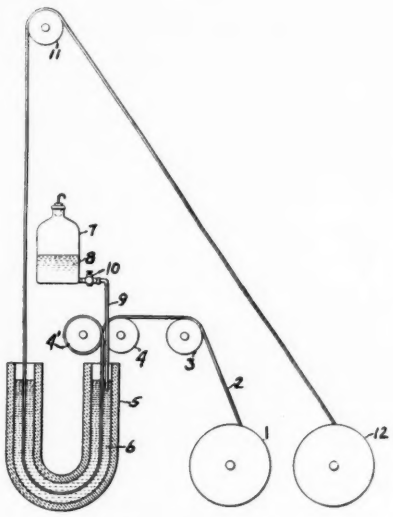


Diagram of Halogen Finishing Apparatus

A preferred solution for treating black, dark-brown, and other dark-surfaced rubber articles comprises a carbon tetrachloride solution of bromine containing about 0.4% by weight of bromine. With such a concentration, passage of the rubber article is made at such a rate as to maintain it in contact with the solution for about 15 seconds. Because bromine discolors light-colored rubber goods, sulphur chloride solution is used on such articles. Inasmuch as sulphur chloride does not react quite so rapidly with rubber as does bromine, more concentrated solutions are employed. A desirable solution is one containing about 0.5% by weight of sulphur monochloride in carbon tetrachloride.

Rubber Substitute[2]

By reacting a polymer of a vegetable oil with a polyhydric alcohol a material is produced that may be vulcanized to give an elastic, resilient product. The reaction product, being either liquid or plastic, may be easily incorporated in rubber or with reenforcing materials. It may be used as a substitute for rubber in paints and finishes and as a coating for textiles, metals, etc., upon which it can be baked. Heretofore rubber substitutes have been difficult of application because of their solid nature requiring expensive milling and other handling in connection with their processing or mixing with natural rubber.

The process utilizes the polymers produced by the long heating of vegetable oils, such as tung oil, oiticica oil, perilla oil, linseed, soya, cottonseed, etc., either with or without a catalyst to hasten polymerization. These polymers have been long considered of no value, and in the use of these oils for making varnishes it has been customary to take steps to prevent polymerization.

As an example 100 grams of the polymer of tung oil and 35 grams of glycerol were heated at a temperature of between 410 to 450° F. until all of the glycerol and tung oil polymer were combined. The resulting product is a reddish viscous material.

Upon the addition of suitable vulcanizing agents, accelerators, and fillers to the viscous liquid which is the reaction product of the wood oil polymers with glycerol, a product may be obtained which has the characteristics of rubber. Besides being elastic and resilient, it has good cohesion, is resistant to superficial oxidation, and is inert to many of the acids, alkalis, oils, and greases that adversely affect natural rubber. The exact character of the resulting product depends upon the vulcanizing agents, accelerators, fillers, etc., employed.

[1] U. S. patent No. 2,132,268, Oct. 4, 1938.
[2] U. S. patent No. 2,111,427, Mar. 15, 1938.

In another example 111 grams of phthalic anhydride and 46 grams of glycerol were heated one-half hour at 410° F. To this were added 290 grams of a combination of oiticica oil polymer and glycerol. The heating was continued until clear and held at this temperature for an additional hour. Then the temperature was raised to 500° F., after which the mass was allowed to cool. The resulting product is resilient and elastic.

Oxidation of Rubber[3]

It is known that rubber may be oxidized in solution by air or oxygen in the presence of catalysts, the process being improved by carrying out the oxidation under pressure. In such a process a solvent is necessary, generally in excess of subsequent requirements so that part or the whole must be removed before use of the oxidized products. According to the present patent, it has been found that if a catalyst be milled into the rubber (catalyzed rubber) and the mixture be suitably spread or dispersed so as to expose a large surface to the air, oxidation is very rapid and a solvent is not required.

To carry out the process the catalyzed rubber is mixed or milled with a large quantity of dry porous cellulosic material such as wood flour; the rubber is dispersed over the surface of this material. Considerable oxidation occurs during the incorporation of the filler. If necessary, oxidation may be completed by heating for a short time at a somewhat elevated temperature, either on the mixer rolls or in an oven. The reaction is best carried out at a temperature of between 80 and 85° C. However it should be noted that an exothermic reaction is set up which may be controlled by cooling the rolls of the mill. Variations in temperature between certain limits do not have so much effect on the nature of the product as the proportion of filler used, but they do affect the rate of conversion and the efficiency of the catalyst. The reaction begins to slow down at a temperature of 75° C., and the catalyst is slowly inactivated above 90° C. At higher temperatures the exothermic reaction may cause ignition of the product.

As oxidation proceeds, the nature and solubility of the products change. The less oxidized material is soluble in white spirit, but insoluble in alcohol and acetone. As oxidation continues, it becomes soluble in acetone while retaining its solubility in white spirit. A still further oxidized product no longer dissolves in white spirit, but is soluble in both acetone and alcohol. These products are designated as resins A, B, and C, respectively. Variations in the kind of resin produced are best obtained by varying the proportion of wood flour and keeping the temperature and time of milling constant. In the following examples milling is carried out for 30 minutes at 80 to 85° C.

EXAMPLE 1

Catalyzed rubber	100 parts
Dried wood flour (100 mesh)	100 parts
Resin content of mixture equals 95% of original rubber and contains:	
A resin	95%
B resin	5%
C resin	nil

EXAMPLE 2

Catalyzed rubber	100 parts
Dried wood flour (100 mesh)	200 parts
Resin content mixture equals 100% of original rubber and contains:	
A resin	25%
B resin	40%
C resin	30%

[Patent does not explain why figures do not total 100%. ED.]

EXAMPLE 3

Catalyzed rubber	100 parts
Dried wood flour (100 mesh)	230 parts
Resin content of mixture equals 107% of original rubber and contains:	
A resin	nil
B resin	10%
C resin	90%

The products can be utilized for the formation of molding powders either alone or mixed with other thermosetting powders, or they may be extracted with a suitable solvent for the separation of the oxidized rubber for use as molding powders or in varnishes.

Non-Inflammable Plastics[4]

Non-inflammable plastic masses suitable for use as floor coverings and molding powders are compounded from chlorinated rubber and chlorinated paraffin wax, the latter fulfilling the function of a non-inflammable plasticizer. Pigments, fillers, etc., may also be added as well as other known plasticizers, the latter in such amounts that the non-inflammability of the product is not substantially affected. It has been found preferable to use a stabilized chlorinated rubber containing about 65% of chlorine and a chlorinated paraffin wax containing about 40% to 50% chlorine. Although different methods may be used for compounding, it is preferred to mix the constituents in the absence of volatile solvents; and the mixing is effected at a raised temperature. The physical properties of the products and, therefore, the use to which they may be put are dependent on the proportion of the various constituents, particularly on the relative amounts of chlorinated rubber and chlorinated paraffin wax. Thus, masses in which the ratio of chlorinated rubber to chlorinated paraffin is high are plastic only at elevated temperatures; while those in which the chlorinated paraffin wax predominates can be worked at room temperatures.

In hot molding mixtures the proportion of chlorinated rubber to chlorinated wax should not be less than 1:1, and for molding powders the ratio should preferably be approximately 3:1 to 10:1 together with fillers such as wood meal, china clay, or cork dust, and pigments such as yellow ochre up to an amount approximately equal in weight to the chlorinated rubber. Such powders can be prepared by first thoroughly mixing chlorinated rubber and chlorinated paraffin wax in the proportion of about 2:3 in a steamheated mixer and then incorporating a further amount of chlorinated rubber on steamheated rollers; the fillers and pigments are subsequently worked into the mass in a similar manner. The final composition is then cooled, and ground. Such molding powders may be converted in the usual way to highly polished translucent or opaque articles of good finish and pleasing appearance.

To prepare plastic masses suitable for floor coverings the ratio of chlorinated rubber to chlorinated paraffin wax should preferably be approximately 2:3, and, in general, proportions lying between 1:1 and 1:3 are suitable. Any suitable heated mixer may be used; the chlorinated rubber and chlorinated paraffin wax are worked together, say at 100° C., until a homogeneous mass is obtained. Fibrous or similar organic fillers such as powdered cork, wood meal, with or without other fillers or pigments such as chalk, kieselguhr, or iron oxide are then incorporated. The mass may become so viscous that milling by steamheated rollers may be necessary to insure homogeneity. To utilize the product as a floor covering it may be merely rolled out into sheets of the required thickness and cut to the desired size, or the sheets may be pressed on to a canvas or cloth backing.

[3] U. S. patent No. 2,132,809, Oct. 11, 1938.
[4] U. S. patent No. 2,120,222, June 7, 1938.

DEFINITION: "An accident is an (unintentional) interruption to an orderly process—a TURNING ASIDE OF AN INTENDED PROCESS. The injury to a person is only the SPECTACULAR evidence of an accident, the *outward sign* of something gone wrong." *N. S. C.*

Manufacture of Rubber Hose for Industrial Service—II

M. Berman [1]

THIS article, conclusion of the one on pages 37-40 of our April issue, continues the discussion of other means of reenforcing machine-made wrapped hose and also deals with hand-made wrapped hose, molded braided hose, and circular woven cotton jacketed hose.

Wrapped Hose, Braided Cord Reenforcement

This hose, which is made on a horizontal braider as shown in Figure 14, combines the essential features necessary for extremely hard and long service—ruggedness, high burst resistance, low stretch, and, in addition, exceptionally flexible kink-proof qualities.

After placing the extruded tube on the mandrel, the unit is passed through the horizontal braider where the cotton cord braid is applied around the tube at a predetermined correct angle. Each pass through the braider adds one ply or braid. As shown in the diagram, (Figure 15), a layer of sheet rubber is placed around each braid prior to the next pass through the braider so as to form a layer of rubber between braids or plies. When the hose is vulcanized, these layers form the protective insulation and bonding medium between the various braided plies.

After the completion of the braiding and rubber cover application, the hose is wrapped before curing as shown in Figure 12.[2] The final curing operation is identical to that used for duck or sheeting reenforced hose. This hose is made in sizes from ⅜-inch to 3 inches internal diameter. Two- and three-braid constructions are most commonly used. For the heaviest duty in the larger sizes only, four-braid hose is frequently furnished.

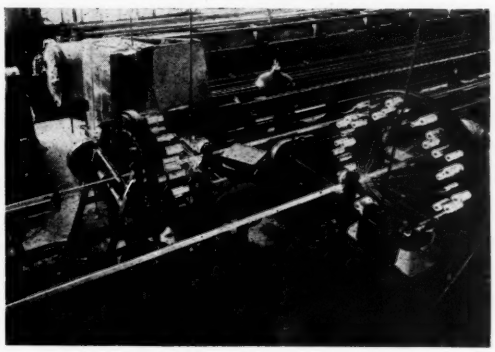


Fig. 14. Braiding Hose on Horizontal Braiding Machine

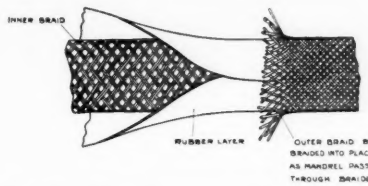


Fig. 15. Applying Rubber Layer between the Cotton Braids

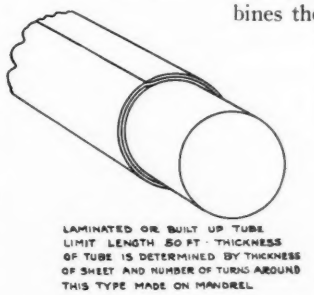

LAMINATED OR BUILT UP TUBE LIMIT LENGTH 50 FT · THICKNESS OF TUBE IS DETERMINED BY THICKNESS OF SHEET AND NUMBER OF TURNS AROUND THIS TYPE MADE ON MANDREL

Fig. 16. Diagram of Built up Tube

Fig. 17. Spinning Wire for Rough-Bore Suction Hose

Wrapped Hose, Combination Duck and Braid Reenforcement

Experience has shown that the outer rubber cover on hose will adhere more tenaciously to a ply of cotton braid than to the closer woven duck carcass. Consequently there has been developed a combination duck and braided construction for special service conditions where the hose cover comes in contact with fats, heat, and chemicals.

This hose is made in the usual manner as wrapped-duck construction, with the added operation of applying a cushion layer of sheet gum over the duck carcass and then passing it once through the horizontal braider prior to the application of the outer rubber cover, thus adding strength as well as increasing adhesion of the cover. The resulting product, which combines the great strength of wrapped-duck hose and some of the flexible qualities of braided hose, is made in sizes from ½-inch to 2½ inches internal diameter.

Wrapped Hose, Combination Asbestos Fabric and Asbestos Braid Reenforcement

This type of hose is made exactly in the same manner as combination duck and braided hose, except asbestos woven fabric is substituted for cotton duck and asbestos yarn for cotton yarn. This asbestos reenforced hose is specifically used for high-pressure and super-heated steam. It is also recommended for service where acid solutions are liable to shorten the life of cotton fabric reenforced hose—such as acid water in copper and coal mines penetrating into the carcass through cuts in the cover.

Wrapped Hose, Combination Duck and Breaker Strip Reenforcement

A similar degree of cover ad-

[1] Technical superintendent, Hewitt Rubber Corp., Buffalo, N. Y.

[2] INDIA RUBBER WORLD, Apr. 1, 1939, p. 40.

Fig. 18. Applying Steel Wire Reenforcement in Rotary Oil Well Drilling Hose

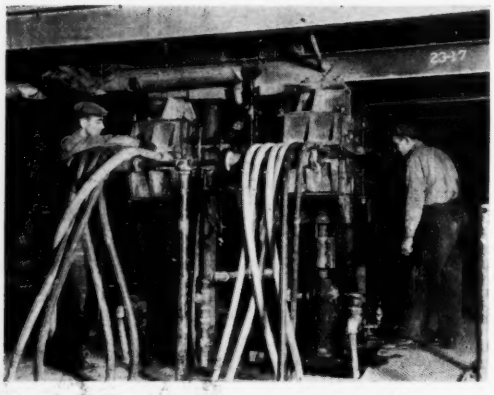


Fig. 20. Curing Molded Braided Hose in Platen Press

hesion to that in the combination duck and braided type can be obtained at lower cost by substituting a ply of open weave fabric, known as cider cloth, for the outer braid. This hose is suitable for service where the hose cover comes into contact with fats and oils, as in creameries, and where subjected to abrasion, as in jetting and contractor's water hose service.

The manufacturing cost is lower with this construction because the cider cloth can be applied in the same operation with the duck reenforcement on the hose making machine. The cider cloth or breaker strip is recommended where cover adhesion rather than increased burst strength and flexibility is necessary. This type also is made in sizes from ½-inch to 2½ inches internal diameter.

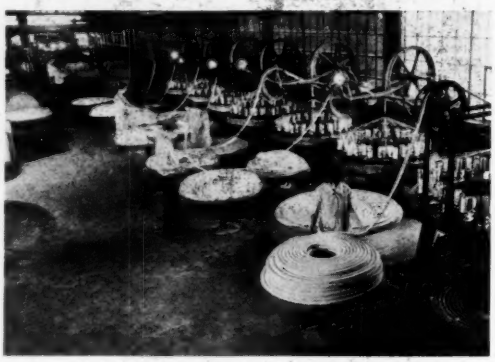


Fig. 19. Applying Cotton Braids on Vertical Braiders for Molded Braided Hose

Wrapped Hose—Hand Made—Mandrel Cured

The wide field for larger diameter hose calls for a system of production in which there is considerable "hand work," primarily due to the fact that the footage production per type is necessarily very much less and for the additional reason that there are wide variations in the construction requirements, such as those necessitated by the use of wire reenforcement. Fundamentally the general process of manufacture is similar to the machine-made process, but is slower and more laborious. The hose tube in "smooth bore" constructions may be extruded by the tube machine, on hose up to 3½ inches internal diameter, but more often the tube is made by hand by wrapping a calendered sheet of rubber in thin layers around the mandrel until the specified thickness is obtained. (Figure 16.)

The carcass of hand-made hose cannot be applied so readily as on the smaller size machine-made product. The mandrels are revolved slowly on a power driven or foot operated "chuck," and the duck plies are carefully applied and knitted together by hand rolling.

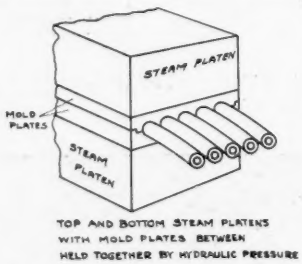

STEAM PLATEN
MOLD PLATES
STEAM PLATEN
TOP AND BOTTOM STEAM PLATENS WITH MOLD PLATES BETWEEN HELD TOGETHER BY HYDRAULIC PRESSURE

Fig. 21. Close-up View of Molded Hose Curing Process

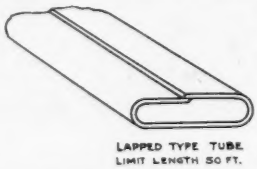


Fig. 22. Lapped-Type Tube

Rough-Bore Suction Hose

In rough-bore construction hose a spiral of wire is first spun around the mandrel, and the hose tube and carcass are built over the wire. (Figure 17.) The purpose of the wire is to provide the internal reenforcement necessary in suction service for preventing the hose from collapsing under a vacuum and to resist kinking when bent at sharp angles.

Smooth-Bore Suction Hose

In smooth-bore construction hose for suction service the wire is placed between the plies of the wall of the carcass, and the hose will resist high vacuum as well as sharp kinks and bending at acute angles. Furthermore for service where corrosive chemical solutions or abrasive materials are present, the smooth-bore type is recommended.

Oil Driller Hose

In certain types of hand-made hose, such as oil well drilling hose, high-tensile steel wire is used in the carcass to add reenforcement to the fabric for resisting exceptionally high pressures which may run up to 5,000 pounds per square inch. This construction is illustrated in Figure 18.

The final wrapping and curing processes are identical to those used in the machine-made types. Hand-made hose is generally made in sizes from 2½ inches internal diameter up. Weight of the duck will range from 12 to 35 ounces per square yard, depending on the type of service.

Molded Braided Hose—Press Cured

Molded braided hose possesses the one outstanding advantage of being manufactured in continuous lengths up to 500 feet. Size for size, it is somewhat lower in cost of production than wrapped hose. However the uniformity and the quality of product cannot be so accurately controlled as in the case of mandrel-cured wrapped hose. The molded braided hose process of manufacture is particularly

adaptable where low manufacturing costs and large production are prime considerations.

In this process the tube is extruded in 500-foot lengths and coiled on a pan. It is then inflated with a small amount of air and drawn through a vertical braider (Figure 19); the braid is applied over the slightly inflated tube. Calendered or sheeted rubber insulation is then folded around the braid, as shown in Figure 15, and a second braid applied, and this cycle is repeated until the specified number of braided layers (usually limited to three) is applied. The hose is then semi-cured; that is, steam at low pressure is conducted through the tube, partially vulcanizing it, and at the same time expanding it into the first braid, the first braid into the insulation, the insulation into the second braid, etc. The rubber cover is next applied around the carcass by extrusion through a special tubing machine.

The hose is now ready for final vulcanizing for which there are two methods: namely, the platen press and the lead press methods. The latter method, in which a lead encasement forms the outer resistance to internal steam pressure during vulcanization, is in wide use where large quantities of light hose such as garden hose are manufactured, as low production cost is possible. In the case of hose for heavier industrial service, the platen press method produces hose of greater uniformity, and this method is used in the Hewitt plant, where the production consists solely of heavy-duty industrial hose such as pneumatic tool, spray, distillate, and high-pressure water hose.

These platen presses are operated by hydraulic pressure and are chambered for steam. They are 19 feet long and about 14 inches wide. (Figures 20 and 21.) Each press has a longitudinal mold containing from five to eight horizontally parallel cavities of the proper size to form the outside diameter of the hose. Air pressure is introduced into the 500-foot reels of semi-cured hose; and, 19 feet at a time, all of the five to eight reels of hose are simultaneously cured in "heats" lasting approximately 20 minutes each. After each successive heat, the hose from each reel is pulled through the press, and the succeeding 19-foot section of each is vulcanized in a continuous length until the entire reel has been completed.

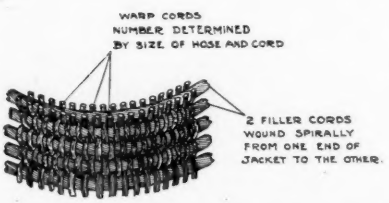


Fig. 23. Details of Cotton Jacket Construction

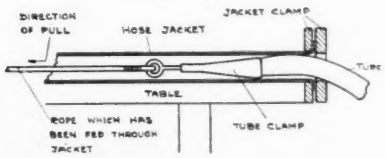


Fig. 25. Pulling the Semi-Cured Tube through Fire Hose Jacket

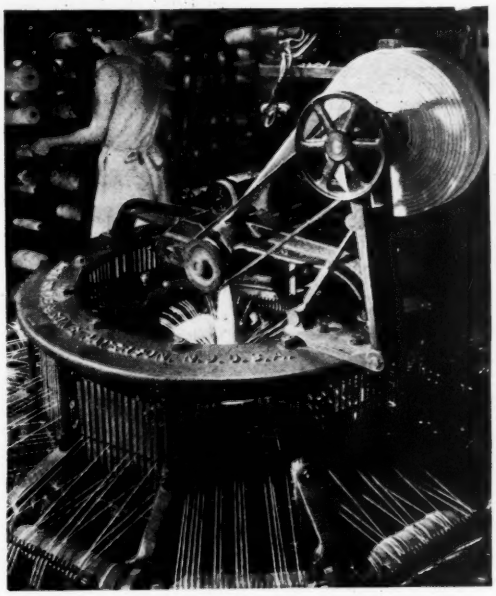


Fig. 24. Weaving Fire Hose Jackets on Circular Loom

Fig. 26. Diagram of Fire Hose Curing Table

Fig. 27. Curing and Testing Fire Hose

Circular Woven Cotton Jacketed Type of Hose

This construction is used for such varieties as fire hose and gasoline hose.

Cotton Jacket Rubber Lined Fire Hose

In fire protection service the requirements are highly specialized and may be summarized as follows: (1) maximum burst resistance and minimum weight; (2) large volume capacity, usually requiring 1½-, 2-, and 2½-inch inside diameters which are greater than the common sizes of machine-made duck reenforced hose; (3) balanced construction to prevent whipping when high-pressure water is passing through it so as to avoid throwing a fireman off the ladder; (4) capability of being coiled easily and compactly after its occasional use.

In this process a 50-foot tube is first built by folding calendered sheet rubber and making a hand-knitted seam. (Figure 22.) The unvulcanized tube, with talc on the inside, is placed on a flat surface and given a partial or semi-cure in the vulcanizer. After removal from the semi-cure, the tube is cemented, and a thin soft "backing" compound is applied around the outside of the semi-cured tube. In the meantime the cotton "jacket," shown in Figure 23, has been woven on a circular loom, as shown in Figure 24. The construction of the cotton yarn reenforcement is governed by the working pressure to which the hose will be subjected in service.

Where "double jacketed" hose is required, a second jacket is made, and the two jackets are fitted to form a circular woven double-ply envelope 50 feet in length. The tube with the backing applied is now pulled through this jacket (Figure 25).

The hose is then removed to the vulcanizing table, where the final cure takes place, as shown in Figure 26. One end of the hose is attached to a stationary steam manifold by means of cone connections. The other end

is attached to a movable manifold with similar cone connections. Steam is introduced into the tube through the head manifold, and the semi-cured tube is thereby expanded out to meet the woven jackets. The hose takes on a circular shape, and the unvulcanized rubber tube and backing are forced into the interstices of the inside woven jacket. During this final vulcanization process the jackets are also stretched. If specified, the cotton jackets may also be treated before vulcanization with a waterproofing, antiseptic wax and gum solution, which makes the hose more impervious to water absorption and more resistant to mildew.

When vulcanization is complete, the semi-cured tube, backing, and jacket will be found to be securely vulcanized into one thoroughly bonded construction. In the case of double jacket hose the outer jacket will be independent of the inside jacket, but the fit is so close as to appear to be a single homogeneous piece of hose.

All fire hose which is made in accordance with the Underwriters' Laboratories' specifications must be tested for bursting strength, elongation, twist, and warp at the factory under the supervision of the Underwriters' representative, and, if proved satisfactory, each length is branded with the Underwriters' label. Certain municipalities, however, have more rigid specifications, which, of course, must be met by the hose manufacturer.

In Figure 27 are shown the successive operations: *center,* inserting tube in jacket; *left,* vulcanizing; and *right,* testing for bursting strength.

Cotton Jacket Hose, Rubber Lined and Rubber Covered

Fire hose is subjected to relatively infrequent use, and to save weight ordinarily no rubber cover is added to the hose. However, where the hose is to be used frequently under abrasive or corrosive conditions, it can be furnished with a protective rubber covering over the jacket. The hose is made as previously described and is then mounted on a mandrel of the proper size. A coat of cement is given the jacket, and a sheet rubber cover applied by hand. The hose is wrapped in the temporary curing wrappers and subjected to the same process of final vulcanization as in the case of wrapped fabric reenforced hose.

Cotton Jacket Hose, Metal Lined

Hose of this type consists of a spirally formed and interlocked metal lining or tube with rubber and fabric outer carcass. The metal tube is first covered with a layer of sheet rubber. It is then passed vertically through a loom where the cotton jacket of similar weave to that used in fire hose is applied. The hose is then vulcanized by placing it in a steam vulcanizing tank similar to those used in the final vulcanization of wrapped fabric reenforced hose.

Smooth-Bore Hose with Synthetic Rubber Lining

Metal-lined cotton jacketed hose was universally used for many years for the dispensing of gasoline at curb pump stations and for unloading of gasoline tank trucks. However, following the recent development of the synthetic rubber-like materials, Neoprene and "Thiokol," the metal-lined hose is being rapidly displaced by the smooth-bore type with cotton braid or seamless woven jacket reenforcement and rubber cover.

The inner lining of synthetic rubber withstands gasoline and fuel oil satisfactorily; whereas natural vulcanized rubber is quickly deteriorated by these materials. There are numerous examples where curb pump gasoline hose, made with synthetic rubber lining, has given more than four years' continuous service and does not yet need replacement; whereas the average life of metal-lined hose in this service is approximately two years.

The rubber cover may be made from plantation rubber compounded to resist abrasion, oil, and sun-checking. But owing to the exceptionally long life of the inner synthetic lining, the outer covers made from plantation rubber are wearing out first because of weather cracking and deterioration by gasoline and oil. One manufacturer (Hewitt) has already adopted the use of a Neoprene compound for this service with remarkable success. Actual experience of more than three years' service with Neoprene covered hose justifies its use in place of natural rubber even though the initial cost is higher. The inherent resistance of Neoprene to the destructive action of sunlight, gasoline, and fuel oil, together with its high abrasion resistance, insures the longest possible life for gasoline and fuel oil hose.

Colloidal Graphite

(*Continued from page* 31)

by volume. This solution is then applied with a brush to pre-cleansed and heated surfaces of metal. After being allowed to dry the coating is then polished wherever possible. A further application of dilute aqueous graphite lubricant should then be made to the rubber face with the result that the two graphite surfaces move one over another with a minimum of friction.

In the past cornstarch, chalk, and similar whitening agents have been dusted lightly over buffed graphite layers before molding colored rubber stock. Finding these not wholly successful in minimizing discoloration for special jobs, research workers are now developing a suitable white colloidal dispersion for this purpose. Similarly as the need of lubrication for rubber parts becomes more evident, experiments with graphite suspensions continue. As a result of these investigations, some interesting developments should be available in the near future.

Ficus Elastica

(*Continued from page* 30)

regarding *Castilloa* latex, and it may be worth while to put them on record. This latex is strongly acid as it exudes from the tree, rapidly creaming to give a light-brown cream and a dark-brown serum. The latex is conveniently purified by diluting the cream with water and recreaming. Six grams of fresh latex required approximately 6 ccs. N/10 NaOH to neutralize as judged by the change in color. The T.S. of this latex was 37.3%. Like *Ficus,* it is not coagulable with acids, but with alcohol, and it does not putrefy. I attempted by treatment with ether to repeat the experiment made on this latex by the late C. O. Weber in Mexico. It will be remembered he obtained a mobile ethereal solution of the rubber which suddenly polymerized to yield a stiff gell, leading him to the conclusion that the rubber in the latex was present in a simpler form than when recovered by the ordinary processes. I failed to obtain the mobile liquid. The effect of ether was to cause coagulation exactly as with fresh *Hevea* or *Ficus.* Subsequently the hydrocarbon dissolved to form a very thick yellow fimbriated gell, with a dark-brown serum below. A repetition of the experiments allowing the latex to drip into the ether straight from the tree gave a similar result.

Safety Films in Industry

F. Merish

SCIENTISTS tell us that 87% of our impressions come through the eye. The superiority of the eye as an impression-producer is evidenced, perhaps more forcibly, by business men who spend millions on eye appeal in display and advertising matter. The motion picture, through its optical effectiveness, creates a more impelling and permanent impression than could be obtained through printed or spoken words alone. With sound added to the film, the impression is even more effective.

Industrial Safety

Wise industrial management affords workers an opportunity to gather at periodical meetings to discuss safety measures and hear lectures on safety. At such meetings the safety film can be put to excellent use. It presents the story of safety much more effectively than mere words of warning, and practically any hazard or preventive measure can be vividly portrayed on the screen.

Most accidents are the result of carelessness, momentary thoughtlessness, rather than gross negligence. One safety film recently reviewed by the author portrayed the daily lives of a manager, foreman, and workman in an industrial plant. In addition to covering a wide range of accidents the picture strikingly and dramatically depicted the effects of these accidents on the morale of the plant and pointed out the necessity of constant alertness as well as the need of modern safety equipment. A worker forgets to put on safety goggles and loses his sight. Another workman mounts a stepladder without making sure that it is well braced; he falls and breaks an arm. Another disregards a sign of "Danger—keep out," and his arm is crushed. Thus this film emphasizes the wisdom of doing all tasks, large or small, with the greatest of care.

The subjects covered in industrial safety films are many and varied. Workmen are shown how to handle heavy drums, pile barrels, lift heavy objects, and how to use tools and machines properly. The films further emphasize the danger of too much haste, the advantage of cleanliness, and the danger of slipping on floors wet with oil or water. Repair men are shown how to test rubber gloves before attempting high-tension work and are warned to lock the switch or power control lever in the "Off" position before starting repairs on machinery. A few of the other typical subjects covered in these motion pictures are: the advisability of receiving first aid, no matter how slight the injury may seem; the safest type of clothing to use; the wisdom of believing in signs that read, "Danger;" and how to extinguish fires or, better still, how to prevent them.

Highway Safety

Highway accidents affect plant production when they incapacitate employes, particularly if these employes are executives, foremen, or key-men on production. Therefore many manufacturers are showing their workers safety films which cover car and truck operation on the highway. These films present the common faults of traffic violators and the serious accidents that may result. The travelogue, produced by a number of motor car manufacturers and obtainable on rental or loan, provide a subtle, but forceful means of getting over this safety message without preaching. The drivers in such films obey all the rules of the road and never have accidents or hazardous experiences, thus lending eloquence to the wisdom of careful driving. Then, too, the travelogue, by taking the audience to interesting places, assure rapt attention throughout the film.

Source of Films

Safety films are produced by insurance companies, associations, and industrialists. Usually one or two reels in length, the films may be sound, silent, or in the form of slides and disks. The latter, often called sound-slides, are least expensive to produce and, in some cases, are preferred because the slide can be kept on the screen as long as desired when prolonged discussion is felt necessary. Sometimes a rental fee of from $2.50 to $10 is charged, but often the films are loaned free of charge. In addition films furthering health and hygiene can be had.

Studios in Hollywood and other cities will produce safety films for any company desirous of having their own. The industrialist with an accident problem will do well to consider giving his safety messages a screen test whether he uses his own films or those from other sources.

Japanese Financial Stringency

(*Continued from page 32*)

greatly increased takings of scrap rubber in the Far East.

Japanese scrap rubber importers, eleven in number, organized an association a year ago, and all buying is said to be now concentrated in the Mitsui firm, which thus far has placed orders almost wholly in the United States. England and France, shipping mainly to Continental Europe, and Canada shipping to the United States have been the other chief sources of scrap rubber moving in international trade in recent years. Every country in the world is a potential source of scrap rubber to the extent that collections are made of worn-out tires and inner tubes, and small quantities are procurable from a great many markets, although the first-quality scrap mainly comes from countries in the temperate zones.

U. S. imports of rubber goods in February totaled $89,871, 2.3% over the $87,884 of January, but 8.7% under February, 1938. February, 1939, exports totaled $2,594,314, 19.4% over the $2,172,872 in January and 34.7% over the $1,925,644 of February, 1938. Exports during the first two months of 1939 reached $4,767,186, 18.9% above the 1938 exports of $4,007,827.

Editorials

N. Y. Group Essay Contest

ON PAGE 45 of this issue details are given of the Prize Essay Contest to be conducted by the New York Group, Rubber Division, American Chemical Society, to stimulate wider activity among the younger men associated with or interested in the rubber industry. An attempt has been made to broaden the scope of the subject matter that will be considered and refrain from limitation of the contest conditions to an extent that resourcefulness and individuality will be encouraged.

This group of technicians forms the nucleus of the rubber industry of the future, and these individuals will be faced with greater responsibilities where breadth of interest and capacity for expression will be of appreciable value.

Detailed analysis of information available on a subject and the reduction of this knowledge to an orderly and understandable presentation of correlated facts or ideas, such as is desirable in a paper, result in a benefit to the author because the preparation requires a search or stock-taking of his knowledge and emphasizes the importance of such details and steps in a logical and complete line of reasoning as are necessary for drawing conclusions or evaluating the results. Although not more than four manuscripts will receive awards, a definite advantage will have accrued to all participants for having critically examined their individual subjects, and the winners will receive in addition to the prize money the distinction of having presented their papers before a rubber group of the American Chemical Society.

Horizon of the Rubber Industry

AS IN other industries, the manufacturers of rubber products are often faced with the question as to the advisability of entering supplementary fields of endeavor. Such contemplation is usually motivated by conditions arising from the perfection of new materials of a nature similar to those with which the industry is accustomed to work, but which open up broader applications, or by the development of new materials of dissimilar formulation which threaten to encroach upon the normal activities of the industry.

At present two such situations are presented to the rubber industry in the form of synthetic rubber-like materials which are finding new and diversified applications and in the form of commercial plastics which have to some extent replaced hard rubber, but which also are superseding other types of material and thereby are presaging an increasing field of application.

Particularly relating to automobile assembly, synthetic rubbers are replacing leather seals and gaskets and are finding new uses for which natural rubber was not wholly satisfactory. The use of synthetic rubber in other industries where oils or heat are encountered appears to be inevitable. Some companies formerly manufacturing leather seals and other companies, heretofore outside of the rubber industry, have equipped for the manufacture of synthetic rubber parts, and in addition to supplying a large portion of the automotive trade with seals and other similar items they are in a position to seek additional synthetic rubber business, thereby encroaching upon a field which naturally falls within the rubber industry. To what degree this trend has progressed may be in question, but certainly synthetic rubbers are continually finding new uses and the extent to which the processing of these materials is taken over by outside companies will depend upon the aggressiveness of the rubber manufacturers in investigating these expansion possibilities.

Many of the so-called plastics lend themselves to a considerable degree for processing on rubber working machinery. The application of these plastics to industrially used parts is still in what might be called the embryo stage. There is, of course, uncertainty as to the limits to which practical application will be possible, but the rapid progress which has taken place in a comparatively short time through diversification of new materials and increased knowledge of fabrication methods may be considered as indicative of the possibilities for wide expansion in the future.

Although the rubber industry has been passing through a transition period of one hundred years, only recently has rubber been recognized as a structural material in transportation vehicles. With the opening of this new field in which the possibilities are still comparatively unknown, it is logical that greater progress can be made through the knowledge to be gained by the correlation of natural rubber, synthetic rubber-like materials, and the commonly termed plastics. In comparison to its size the rubber industry probably has the most extensive technical talent of all industries. By coordinating the potentialities of related developments and by broadening its scope of effectiveness the rubber industry can assume a position of even greater influence.

EDITOR

What the Rubber Chemists Are Doing

A.C.S. Rubber Division Activities

Spring Meeting

WITH headquarters in the Emerson Hotel, Baltimore, Md., the Rubber Division, A.C.S., convened on April 5 and 6 in conjunction with the general meeting of the American Chemical Society, which extended throughout the week of April 3 to 7. The program and abstracts of the 22 technical papers (except one) were published in the April issue of INDIA RUBBER WORLD.

With approximately 325 attending, the Rubber Division meeting was outstanding not only as to the volume and quality of the papers presented, but the close adherence to schedule, the proper timing of the papers, and the splendid facilities available gave evidence of careful planning and resulted in a sincere interest in the proceedings. The presentation of 12 papers at the symposium on synthetic rubber-like materials and elastic polymers during the two sessions on Tuesday emphasizes the growing interest in these newer materials.

Crude Rubber Report

Concluding the afternoon general session on Wednesday, R. H. Gerke, chairman, presented the report for the Crude Rubber Committee, which, in addition to the chairman consisted of E. B. Babcock, L. M. Freeman, Ian Patterson for G. A. Sackett, and J. C. Walton. Final revision of the "Tentative Procedures for Testing the Variability of Normal and Concentrated Latex" has been completed, and publication is being arranged. Progress was reported in the development of the "Procedure for Quantitative Dirt," which depends upon dissolution of the rubber and filtration through a 200-mesh sieve. Regarding the preparation of samples from bales for plasticity determination, the European and United States procedures will be studied in an attempt to select an adequate method. Progress was reported on the development of an apparatus for determination of mechanical stability of latex. Dr. Gerke stated that progress is being made by the London Advisory Committee for Rubber Research toward the development of uniform rubber from the viewpoint of curing time and that the Crude Rubber Committee is in agreement with the principles and believes that the efforts in this direction are commendable. Past reports of the Crude Rubber Committee have been condensed for future publication collectively.

At the business meeting which followed a motion was passed that the report of the Crude Rubber Committee be accepted, the committee continued, and a vote of thanks extended for its work. A motion was passed that a committee be appointed by the Division chairman to review the paper presented by H. L. Fisher on "The Nomenclature of Synthetic Rubbers" and suggest standardization of names for synthetic materials.

W. S. Davey, who has been senior chemist for the London Advisory Council for Rubber Research, and who was enroute from London to take up his new duties as head of the Chemical Division of the Rubber Research Institute of Malaya, commended the formation of the Crude Rubber Committee, which forges the link between producer and consumer and expressed his appreciation for the opportunity of meeting those present at the Baltimore meeting. Dr. H. E. Howe, editor of *Industrial and Engineering Chemistry*, spoke of the great interest in the fall meeting at Boston to honor the achievement of Charles Goodyear when at certain sessions the Rubber Division will be host to the entire A.C.S. assembly. George Hinshaw, chairman of the Rubber Division, expressed his realization of the honor bestowed on him, thanked those who had made the meeting a success, and solicited the assistance of the members to put the Boston meeting on such a plane that it would be a fitting tribute to the discovery which remains the basis of the Rubber Industry.

At the well attended Rubber Division banquet on Tuesday evening, General Hugh Johnson gave a very enlightening discussion of the European situation and in his inimitable manner answered a lengthy barrage of questions which followed.

Centennial Meeting Program

The program for the Boston meeting to celebrate the One Hundredth Anniversary of the Birth of the Rubber Industry was outlined by J. M. Bierer, committee chairman, who is assisted by C. R. Boggs, W. B. Wiegand, and A. A. Somerville as executive members, and an advisory board of 10. A three-day meeting is planned with an opening general session with the entire A.C.S. attending on the afternoon of Wednesday, September 13, at which the following papers will be presented: "What Is Vulcanization," E. B. Babcock, Firestone; "The Work of Thomas Hancock," A. B. Newhall, Goodrich; "The Work of Charles Goodyear," R. W. Lunn, Leyland & Birmingham Rubber Co., Ltd., (England); "The Rubber Industry Since 1839," W. A. Gibbons, U. S. Rubber. At the general A.C.S. banquet with the Rubber Division in charge on Wednesday evening the speakers will be: P. W. Litchfield, president of Goodyear, "The Rubber Industry;" W. S. Knudsen, president of General Motors Corp., "What the Rubber Industry Has Meant to the Automobile Industry;" Karl T. Compton, president of M.I.T., "Vulcanization from the Physicist's Standpoint;" J. B. Conant, president of Harvard University, "Vulcanization from the Chemist's Standpoint."

The following papers have been promised for the Rubber Division sessions on Thursday and Friday: "What Is Vulcanization," H. L. Fisher, of U. S. Industrial Alcohol Co.; "Theory of Vulcanization," L. B. Sebrell, of Goodyear; "Effect of Vulcanization on Structure," W. F. Busse, of Goodrich; "Thermodynamics of Vulcanization," Ira Williams, of J. M. Huber; "Reenforcement as a Function of Vulcanization," C. R. Park, of Firestone; "Physical Changes Induced in Vulcanization," W. W. Vogt, of Goodyear; "X-Ray Studies of Vulcanization," G. L. Clark, of the University of Illinois; "Effect of Variability of Rubber on Vulcanization," a representative from the British Rubber Producers Research Association (Edgar Rhodes has been invited, and word has been received that some one from the association will deliver the paper); "Vulcanization of Latex," C. E. Bradley, of U. S. Rubber; "What Is Optimum Cure?" J. C. Walton, of Boston Woven Hose; "Temperature Coefficient of Vulcanization," R. H. Gerke, of U. S. Rubber.

N. Y. Group Essay Contest

AT ITS meeting on March 17, 1939, the New York Group, Rubber Division, A.C.S., voted to sponsor a prize essay contest for members under 35 years of age. The chairman of the

Group has appointed a committee of four to take full charge of the contest and to judge the papers.

The subject matter should be of a technical nature relating to a property of rubber, compounding materials or practice, processing methods, technical equipment, or some such phase of rubber technology.

In view of the fact that all rubber technicians may not have full opportunity to report original work or development results, the committee will give equal consideration to interpretive reviews of rubber literature relating to a particular phase of rubber technology.

From all papers submitted the committee will select at least one and not more than four papers, each of which is to be presented by the author at the first Fall meeting of the New York Group, and prize money totaling $100 will be distributed in the order of their value according to the best judgment of the committee, which will give consideration to clearness, conciseness, and informative value.

All rubber technicians, research workers and college students interested in the rubber industry are cordially invited to enter this contest. All entrants whose membership in the New York Group for 1939 is not paid must enclose $1 for the year's membership with the paper when submitted.

The closing date for receiving papers is September 1, 1939. In order to avoid identification of the author when the papers are judged, the author's initials should appear in the upper right-hand corner on each page of all copies, but the author's name and address should appear *only* on a separate piece of paper attached to the entry. All entries in quadruplicate, typewritten, and double spaced should be submitted to the Chairman of the Contest Committee, S. C. Stillwagon, INDIA RUBBER WORLD, 420 Lexington Ave., New York, N. Y.

Los Angeles Group

THE Los Angeles Group, Rubber Division, A.C.S., held its last monthly meeting on April 4, at the Mayfair Hotel, Los Angeles, Calif., with 85 members and guests in attendance.

Following dinner and entertainment by the Los Angeles County Negro Quartet, H. J. Jordan, of the E. I. du Pont de Nemours & Co., Inc., sponsor of the program, spoke on Neoprene, covering its history, applications, and properties. E. M. Wilson, general agent of the American President Lines, then discussed the importance and problems of the American Merchant Marine. The group presented Mr. Wilson with a number of rubber products.

Table favors, Prest-O pocket oilers, were presented by the Dill Mfg. Co. A card table, donated as a door prize by Edward Tufft, of the *Rubber Age*, was won by L. G. Koenig; while an electric clock from R. Abbott, of the C. P. Hall Co., was won by Garvin Drew.

The annual fishing trip will be held at Catalina this year, the date and details to be announced later.

Akron Group

THE Akron Group, Rubber Division, A. C. S., held its spring meeting and dinner on March 24 at the Mayflower Hotel, Akron, at which W. J. McCortney, of the Chrysler Corp., discussed "What the Automotive Industry Expects of the Rubber Chemist." Special guests of the evening were R. B. Searight and Guiseppe Vidale, of the Pirelli company, Milan, Italy.

Election of officers for the coming year was held, with the following results: chairman, Ralph La Porte, Seiberling Rubber Co.; vice chairman, H. V. Powers, Goodyear Tire & Rubber Co.; secretary-treasurer, T. L. Stevens, C. P. Hall Co.

The next affair scheduled by the group is the summer outing, probably in June.

Chicago Group

AT THE March 31 meeting of the Chicago Group, Rubber Division, A. C. S., at Hotel Sherman, Chicago, preceded by dinner and entertainment, Edward R. Dillehay, chief chemist, The Richardson Co., Melrose Park, Ill., presented "Recent Developments in Modern Plastics," during which he discussed in detail the chemical constituents and physical properties of each of the many types of synthetic plastics offered for the manufacture of molded products.

Following Mr. Dillehay's discussion two motion pictures were shown: "Modern Plastics Preferred" and "Developments in Bakelite Resins," through the courtesy of *Modern Plastics Magazine* and the Bakelite Corp., respectively.

The group will hold its next meeting on May 12.

N. Y. Group Outing

PLANS have been completed for the annual outing of the New York Group, Rubber Division, A. C. S., to be held June 10 at the Alps Castle, Preakness, N. J., near Paterson, the same place at which the 1936 and 1937 outings were held. The committee, headed by Fred Traflet, of the Pequanoc Rubber Co., Butler, N. J., has planned for a great variety of outdoor sports including soft ball, boccie, horseshoe pitching, etc., and arrangements have been made for golfers to play on the Preakness Hills Country Club course provided all tee off before 10 a.m. Refreshments will be served during the day, with a complete dinner late in the afternoon. Orders for tickets and reservations should be sent to B. B. Wilson, secretary-treasurer, care of INDIA RUBBER WORLD, or Peter P. Pinto, care of *Rubber Age*, 250 W. 57th St., New York. The price of tickets now set is $3 for members, $4 for non-members.

R. I. Rubber Club

THE spring meeting of the Rhode Island Rubber Club, held at the Narragansett Hotel, Providence, R. I., on April 21, attracted close to 100 members and guests. At the meeting, presided over by Chairman Charles Berlow, the first speaker was C. W. Taylor, of Howe & French, Inc., Boston, Mass., who talked on "Lacquer Application and Reasons for Lacquering Rubber." He told of the advantage of fine lacquer finishes in increasing the sales appeal of rubber goods and then mentioned some of the problems that had been overcome in developing lacquers that would adhere properly to the rubber, resist reactions of compounding chemicals, and be properly elastic. In the course of his address Mr. Taylor emphasized the need of cooperation between rubber and lacquer technicians in producing finer and more lasting finishes.

The second and last speaker was L. R. Yeager, of the Owens-Corning Fiberglass Corp., Toledo, O., who gave a highly interesting talk on the production of glass textiles, illustrated with samples of glass threads, yarns, and woven fabrics and followed by motion pictures which showed the various processes that are followed in their manufacture.

Ontario Division

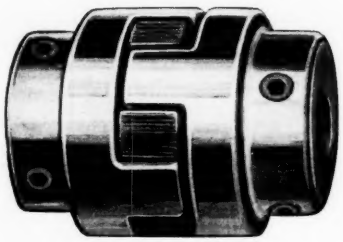
THE Ontario Rubber Division of the Canadian Chemical Association convened at the University of Toronto, Toronto, Canada, on March 28 and after dinner attended by 30 members heard Dr. Wm. G. Nelson, of United States Rubber Co., Detroit, Mich., speak on "The Physical Testing of Rubber." Dr. Nelson stressed the need of thorough tests of raw materials, in process materials and finished materials, mentioned the great variety of tests performed, and described the machines and methods used for many of them. A lively discussion followed the lecture, which was illustrated with lantern slides.

At the April 20 meeting F. E. Rupert, of Monsanto Chemical Co., Rubber Service Division, Akron, O., talked on "Modern Rubber Compounding and Processing in the Cable Industry."

To Order "Proceedings"

W. F. V. Cox, secretary, The Institution of the Rubber Industry, 12 Whitehall, London, S.W.1, England, has announced that only 120 copies of "The Proceedings of the Rubber Technology Conference" remain; so all those interested in securing copies should do so at once. INDIA RUBBER WORLD will be glad to handle any inquiries from our readers for this important book.

New Machines and Appliances



Resilient Coupling

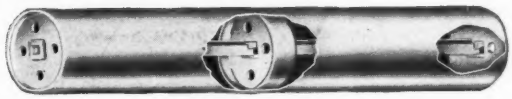
Safety Flexible Coupling

MISALINEMENT, starting torque, shocks, etc. on direct connected machinery are compensated for through the use of a three-piece flexible coupling, comprising two Tobin bronze flanges and an interlocking cushion spider of rubber. Because Tobin bronze will not spark under any conditions, the safe use of this coupling is indicated where explosive and inflammable gases, vapors, and liquids are handled. It is said to be quiet in operation and requires no lubrication. These couplings are made in standard sizes with bores of from one- to 2¼-inch inclusive. Lovejoy Flexible Coupling Co.

Barrel Discharge Elevator

BARRELS and drums are picked up and raised to any desired height for discharging by a recently developed discharge elevator. Thus liquids, powders, and fine granulated materials may be quickly and safely fed into hoppers, vats, and truck bodies. A special harness is used to secure the barrel or drum to the elevator forks, and the container is manually tilted by a slight pull after it has reached the proper height. The elevators are built in numerous capacities for various lifting heights. The firm's regular hand or electrically operated elevators may be adapted to this service through the application of special attachments. Barrett-Cravens Co.

Elevator for Discharging Barrels



Gammeter Calender Shell

Dynamic Wheel Counterbalancer

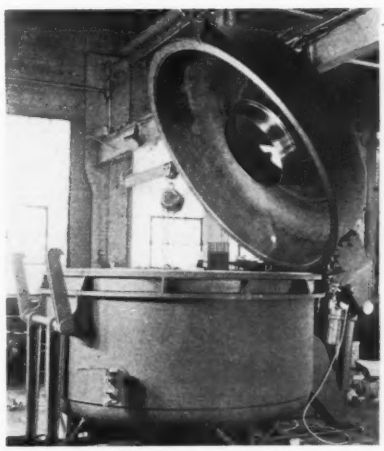
AUTOMOBILE wheels with the tires mounted are balanced both statically and dynamically through the use of a recently developed dynamic counterbalancer. A ¼ h.p. motor drives a horizontal shaft equipped with a counterbalancer weight which may be moved lengthwise of the shaft or rotated around the shaft by means of two separate hand levers. The spindle which accommodates the wheel is mounted on a central pivot that permits the shaft to oscillate if there is any unbalance present.

After the wheel is in place, the shaft is disconnected from the motor assembly by means of a clutch. With the shaft free to rotate, the heavy side of the wheel swings to the bottom. After compensating for this static unbalance by applying weights to the wheel in the usual manner, the clutch is slipped in and the motor started with the hand levers in the zero position. If the wheel is dynamically out of balance, the indicator hand will vibrate. The two hand levers which actuate the counterbalancer weight are moved forward and backward until the pointer ceases to oscillate. The position of the left-hand lever as registered on a scale alongside the handle indicates approximately the size weights to apply; while the position of the right-hand lever indicates the location where the weights should be attached for correct dynamic balance. Weaver Mfg. Co.

Weaver Wheel Balancer

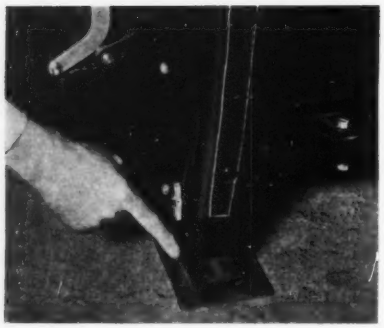
All-Steel Calender Shell

A NEW all-steel calender stock shell of improved construction is welded throughout, is hardened to insure long life, and has forged steel hubs. The vent openings in the heads are sufficiently large to receive conveyer hooks. The new shell is said to be strong, sturdy, and trouble-proof. W. F. Gammeter Co., Cadiz, O.



90-Inch Electric-Operated Vacuum Expander for 24.00-32 34-Ply Earth Mover Tire. National Rubber Machinery Co.

New Goods and Specialties



Vibration-Dampener under Accounting Machine Leg

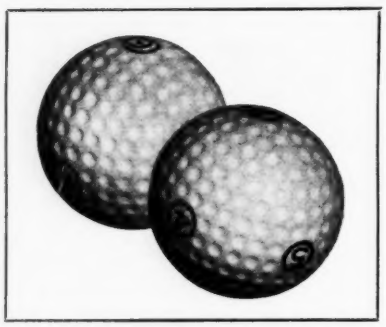
Vibration Dampener

TO REDUCE the transmission of noise and vibration from electrically driven comptometers and various other accounting machines, Universal vibration dampeners, made of especially compounded rubber, are placed between the feet of the machines and the floor. By absorbing shocks these dampeners also prolong the life of the machines. Installation of the vibration dampeners requires no alteration of the machines, and application may be readily made to machines already in service. Goodyear Tire & Rubber Co.

Dice Golf Ball

THE Dice golf ball, with the numerals 1 to 6 marked at points equidistant around its surface, introduces a new element of fun to golf by enabling a player to play for points as well as score. Each box of one dozen contains three balls marked in each color—red, blue, green, and black for purposes of identification during play. The number of different games that may be played along with regular golf is limited only by the ingenuity of the players. One suggested method consists of each player putting out as usual and after all the balls are in the cup, the score is taken by counting the uppermost number on each ball as it lies in the cup. In another method the score may be taken after each player has approached and all four balls are on the green.

The Dice ball, aside from its amusement possibilities, is said to be a quality performance ball with a high compression liquid center, high tension 60-point winding, and a tough cured cover. The ball is triple-tested: for shape on an X-ray machine; for toughness of cover on a guillotine tester; and for distance by a compression machine. The Worthington Ball Co.



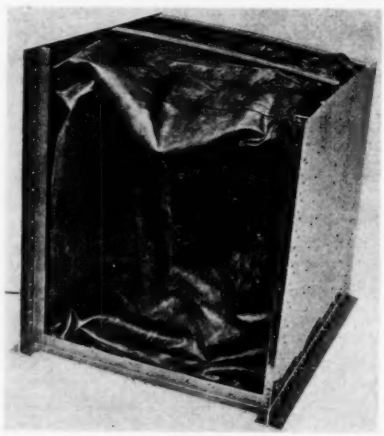
Numeral-Marked Golf Ball

Vibration- and Corrosion-Proof Fuel Cell

IN THE design of light-weight tanks for the transportation or storage of petroleum products, a new-type fuel cell was developed which comprises an inner liner of Neoprene impregnated fabric, supported externally by a metal compartment. The fuel cell is slightly larger than its compartment and is installed in much the same manner as is an inner tube in a casing. Because of its oversize the Neoprene fabric is never subjected to stretching; all strains and stresses are taken by the surrounding structure. With a design of this sort it is not necessary to have a metal compartment which will remain leak-proof as long as the bag or liner satisfactorily performs this function.

When subjected to a standard, high-frequency, low-amplitude vibration test, the bag was fuel-tight after a period of 700 hours and it is claimed that 25 hours' resistance is the maximum requirement in any service. As the Neoprene fabric is not affected to any considerable extent by petroleum hydrocarbons or by salt water, a high degree of corrosion resistance is insured. In investigating this property a cell was filled with aviation gasoline and left untouched for 12 months. Inspection at the end of that time failed to disclose deterioration.

Quick repairs may be made to the impregnated fabric, and spare bags, light in weight, can be carried and readily installed. The low weight-gallonage ratio makes this tank particularly suited for airplanes, and it has already been installed in sizes up to 185-gallon capacity. It is believed that its unique properties will make the use of such a construction advantageous in many other industries besides aviation. Glenn L. Martin Co.



Neoprene-Fabric Fuel Cell Showing Part of Supporting Structure

Unique Agricultural Tire

NOW on the market appears an unusual tire which, unlike ordinary tires that have the tread at a right angle to the diameter of the casing, has its tread set at a sharp angle to the sidewalls because in service on the tail wheel of a tractor-plow the tire operates in an angular position. This construction permits maximum efficiency because when the plow is in operation, the tail-wheel tire goes along the furrow in the position illustrated here. This tire is protected against ground wear by a heavy angular tread and against furrow wall chafing by a thick protecting rubber flange. The new tire also cushions road shocks and allows greater speeds. The B. F. Goodrich Co., Akron, O.

New Goodrich Tire for Plow Tail Wheel

Rubber Industry in America

FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y. For 1938: net loss, $97,781, against net income in 1937 of $1,985,242, or $4.70 each on the 421,981 capital shares outstanding. Current asset on December 31, 1938, were $10,364,790; current liabilities, $2,619,233, contrasted with $12,153,127 and $4,642,322, respectively, on December 31, 1937.

Armstrong Rubber Co., West Haven, Conn. For 1938: net income, $213,000, equal to $3.75 each on 56,725 common shares, against $85,371, or $1.54 each on 55,395 shares, in 1937.

Collyer Insulated Wire Co., Pawtucket, R. I., and subsidiaries. For 1938: net loss, $62,473, against a net income in 1937 of $208,547, equal to $1.39 a share on 150,000 capital shares.

Detroit Gasket & Mfg. Co., Detroit, Mich. For 1938: net profit, $122,710, equal to 29¢ a common share, against $513,721, or $2.08 a share on common, in 1937.

March quarter: net income, $128,010, equal after preferred dividends, to 53¢ each on 214,250 common shares, against net loss of $23,807 last year.

Dominion Rubber Co., Ltd., Montreal, P. Q., Canada, and subsidiaries. For 1938: net loss, $530,814, against $222,205 loss in 1937.

Flintkote Co., 50 W. 50th St., New York, N. Y., and subsidiaries. Twelve weeks to March 25: net income, $102,494, equal to 15¢ each on 672,996 shares of outstanding stock, against net income of $3,397 in the same period of 1937. Net income for the year ended March 25, $910,915, or $1.35 a share, against $1.22 a share in the corresponding period of the previous year. Net sales for the 12-week period totaled $2,850,117, against $2,833,184 in the 1938 period; while the volume for the 52 weeks amounted to $15,164,642, against $14,683,983 for the corresponding weeks of the previous year.

General Cable Corp., 420 Lexington Ave., New York, N. Y. March quarter: net loss, $196,773, against $66,147 last year.

Gillette Rubber Co., Eau Claire, Wis. For 1938: net income, $761,843, equal to $3.81 each on 199,762 common shares, against $320,336 or $1.60 a common share in 1937.

L. H. Gilmer Co., Tacony, Philadelphia, Pa. March quarter: earnings before taxes on income were $31,329, against earnings of $15,317 on same basis last year. Sales for the period increased 17% over those in the first quarter of 1938.

Hewitt Rubber Corp., Buffalo, N. Y. March quarter: net earnings, $41,573, equal to 25¢ a common share, against $10,691 or 6¢ a share the year before.

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y. For 1938: net loss, $62,810.54 against net income of $184,234.75 in 1937. Current assets on December 31, 1938, were $921,349.15 against $900,771.51 on December 31, 1937; current liabilities, $96,660.71 against $144,453.62.

I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y., and subsidiaries. For 1938: net profit, $211,548, equal to $1.27 each on 166,095 shares of common stock, excluding 23,905 shares held in treasury, against net profit of $119,297, or 71¢ each on 168,275 shares of common stock, in 1937.

Laher Spring & Tire Corp., Oakland, Calif. For 1938: net income, $20,343, equal, after preferred and Class A dividend requirements, to 47¢ each on 20,000 Class B shares, against $10,400, or $1.72 each, on 6,041 preferred shares in 1937.

Lima Cord Sole & Heel Corp., Lima, O. For 1938: net income $40,511, against $25,381 in 1937.

Monsanto Chemical Co., St. Louis, Mo. March quarter: net income, after all charges, $1,239,899, equal after deductions for preferred dividend requirements and minority interests to 88¢ a share on the 1,241,816 common shares outstanding on March 31, 1939. Net earnings for the comparable period of 1938 were $669,311, or 52¢ a share on the 1,114,388 common shares then outstanding. Sales in the first quarter were approximately 30% better than in the same period of 1938, but slight decline from sales for the last quarter of 1938 was registered.

Thermoid Co., Trenton, N. J., and domestic subsidiary. March quarter: net profit, $65,150, equal after quarterly dividend requirements on 39,956 shares of $10 par, $3 convertible preferred stock outstanding at close of period, on which is an accumulation of unpaid dividends, to 7¢ a share on 476,388 common shares. This contrasted with net loss of $95,741 last year. Twelve months to March 31: net profit, $180,844, or 13¢ a common share, against net loss of $15,459 for the year ended March 31, 1938.

Baldwin Rubber Co., Pontiac, Mich. March quarter: net income, $120,559, equal to 38¢ each on 316,757 shares, contrasted with net loss of $31,675 last year. Six months ended March 31: net income, $277,402, equal to 87¢ a share, against $42,282, or 13¢ a share in the corresponding period one year ago.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Detroit Gasket & Mfg. Co.	Pfd.	$0.30 q.	June 1	May 15
De Vilbiss Co.	Com.	$0.25 irreg.	Apr. 15	Mar. 31
De Vilbiss Co.	7% Pfd.	$0.17½ q.	Apr. 15	Mar. 31
Dow Chemical Co.	Com.	$0.75	May 15	May 1
Dow Chemical Co.	Pfd.	$1.25 q.	May 15	May 1
Dunlop Rubber Co., Ltd. (American Dep. Rec.) for ord. reg.	Com.	$0.30 final	Apr. 22	Mar. 23
Goodyear Tire & Rubber Co.	Com.	$0.25	June 15	May 15
Goodyear Tire & Rubber Co.	Pfd.	$1.25 q.	June 15	May 15
Hercules Powder Co.	Pfd.	$1.50 q.	May 15	May 4
Mid-West Rubber Reclaiming Co.	Com.	$0.25	May 1	Apr. 21
Norwalk Tire & Rubber Co.	Pfd.	$0.87½ q.	July 1	June 15
Okonite Co.	Com.	$0.50 q.	May 1	Apr. 18
Okonite Co.	Pfd.	$1.50 q.	June 1	May 18
Pharis Tire & Rubber Co.	Com.	$0.15	May 20	May 5
Plymouth Rubber Co.	7% Pfd.	$1.75 q.	Apr. 15	Apr. 1
U. S. Rubber Reclaiming Co.	pr. Pfd.	$1.00 accum.	May 2	Apr. 28
S. S. White Dental Mfg. Co.	Com.	$0.15 q.	May 16	May 1

Dividend Correction

On page 63 of the April issue, through an error, the tabulation indicated that dividends were payable March 24, 1939, and June 23, 1939, on United States Rubber Co.'s common stock. The United States Rubber Co. declared dividends only on the 8% non-cumulative preferred stock.

OBITUARY

George W. Spratt

A HEART attack on March 18 caused the sudden death of George Walter Spratt, sales promotion manager of the Gillette Rubber Co., Eau Claire, Wis. An alumnus of Lawrence College (Class of 1914), he first was manager of the Fisk Tire Co. branch in Eau Claire, but in 1922 was appointed credit manager for the Northwest states. In 1928, however, Mr. Spratt returned to Eau Claire and joined Gillette as a salesman, later becoming assistant sales manager and then sales promotion manager.

He was born in Morrisonville, Ill., in 1891. He belonged to the Kiwanis Club, all Masonic bodies, and the Episcopal Church. His hobbies were fishing, gardening, and bridge.

Funeral services were conducted on March 21 at Christ Church Cathedral, Eau Claire, and burial was in Lake View Cemetery.

The deceased leaves his wife, a son, and a daughter.

A. N. Day

COMPLICATIONS following pneumonia led to the death, on Palm Sunday, of A. N. Day, West Coast manager of bus and truck tire sales for the Goodyear Tire & Rubber Co., Akron, O., for the last 12 years. Born in Washington, D. C., 53 years ago, Mr. Day abandoned the study of medicine for the theatre. He later was attracted to the commercial field and served the Firestone Tire & Rubber Co. and Overman Cushion Tire Co., Inc., for several years before joining Goodyear.

He is survived by his wife, his mother, and a sister.

James Cavanagh

JAMES CAVANAGH, head of the research division of United Shoe Machinery Corp., Boston, Mass., with which he had been connected since its organization in 1899, died suddenly of a heart attack on April 12. Mr. Cavanagh, who was born in New York, N. Y., May 15, 1869, and educated in schools there, was well-known as an inventor and had a great many patents to his credit.

Survivors include his wife, three daughters, his mother, four brothers, and two sisters.

A requiem mass was sung on April 15. Interment was in Holyhood Cemetery, Brookline, Mass.

John Jay Watson

A SUDDEN heart attack on March 30 at his office in Albany, Ga., ended the long and successful career of John Jay Watson, president and chairman of the board of Lee Tire & Rubber Co.,

Blank & Stoller

John Jay Watson

Conshohocken, Pa., and of the International Agricultural Corp., 61 Broadway, New York, N. Y.

Born in Jamestown, R. I., on November 12, 1874, he later attended the local district school, Rogers High School, Newport, R. I., and Bryant & Stratton Business College, Providence, R. I. In 1896 Mr. Watson joined the Industrial Trust Co., Providence, but resigned three years later to become treasurer and a director of the Joseph Banigan Rubber Co. When this concern became associated with the United States Rubber Co., New York, he went with it, becoming successively, second assistant treasurer (1901) of U. S. Rubber, treasurer (1904), director (1905), member of the executive committee, and president (1908) of two of its affiliates, Rubber Goods Mfg. Co and General Rubber Co. Mr. Watson was also a leading influence in starting a rubber plantation in Sumatra for the corporation.

Retiring from the manufacturing business in 1910, the deceased returned to banking, becoming senior partner in the firm of Watson & Pressprich, private banking house in New York. In 1913, however, the financier was elected vice president of the International Agricultural Corp. and after a decade was made president and chairman. In 1914, Mr. Watson became interested in the Lee company, became first vice president and a director and later was elected president and chairman of the board. He was also chairman of the Lee subsidiary, Republic Rubber Co., Youngstown, O., and an officer and a director in several other concerns.

A Republican, Mr. Watson served (1897) as moderator of Jamestown, R. I.; as a member of the Rhode Island House of Representatives from 1899 to 1904; as a member for the same period of the State Board of Charities and Correction; and in 1904 was an alternate delegate to the Republican National Convention at Chicago.

He was also a member of the French Legion of Honor (1926), a former member of Squadron A, New York National Guards, and belonged to the United States and New York chambers of commerce, Society of American Wars, Society of Colonial Wars, Sons of the American Revolution, New England Society of New York, Rhode Island Historical Society, Union Interalliee (Paris), Masonic order, Knights Templar, Metropolitan Museum of Art, and several clubs including Metropolitan, Nassau Country, Union League, New York Yacht, and Congressional (Washington, D. C.).

Surviving are his wife and a sister.

Funeral services were held on April 1 at St. Thomas Episcopal Church in New York and on April 2 at the Watson summer home in Jamestown, R. I. Interment was in Cedar Cemetery.

Frank R. Jones

FRANK R. JONES, vice president and general sales manager of Johnson & Johnson, manufacturer of druggists' sundries and surgical supplies, New Brunswick, N. J., from 1905 until his retirement on April 1, 1929, died of apoplexy on April 10. His previous business connection, which lasted many years, was with J. Ellwood Lee Co., manufacturer of rubber goods, Conshohocken, Pa., where he was born 75 years ago.

The deceased, who was a 32nd degree Mason and active in the Episcopal Church, is survived by his wife, a brother, and three sisters.

The funeral took place on April 12, with burial at West Laurel Hill Cemetery, Philadelphia, Pa.

J. D. Wilmot

JAMES DESHLER WILMOT died on April 24 at a hospital in Boston, Mass., following a second operation for a stomach ailment. Born in New Brunswick, N. J., in 1891, and a graduate of Rutgers University, Mr. Wilmot had been associated with the United States Rubber Co. since 1911. At the time of his death he was factory manager of the company's factory at Providence, R. I., and had previously served in the same capacity at the footwear plants in Malden, Mass., and Woonsocket, R. I.

He was the grandson of the late James Deshler, who, for a half century was one of the outstanding men in the rubber industry. Mr. Wilmot is survived by a wife and two sons.

(Continued on page 56)

EASTERN AND SOUTHERN

BUSINESS remains sluggish and hesitant, with general manufacturing activity fluctuating narrowly, having declined a little each month since December. Deterrent features include the coal strike in the East, the lack of new funds flowing into industry, the failure of the administration's appeasement policy (with business) to reach a concrete stage, and recurrent crises abroad. Industrial activity, however, is on a much higher level than a year ago, and business fundamentals are generally favorable; yet a moderate rise in industrial production, if any change should occur within the next few months, is more likely than a sharp upward spurt.

Recent estimates indicate that freight-car loadings in the second quarter of this year will be about 12.6% above the actual loadings in the same period last year. Machine tool orders keep gaining, having approached the highest point since September, 1937. Textile mills in eastern Tennessee, moreover, are operating full time for the first time in several years. The oil industry is in a basically sound position, although there is some talk of overproduction. Farm operations, however, slowed down slightly because of the uncertainty regarding the federal farm program.

Steel output dropped last month in a contraseasonal trend to 48.6% of capacity; while orders have been declining from most consumer industries, particularly from railroads and automobiles, and new business has failed to develop as expected. This decline in steel ingot output, it is believed, will continue until new business and output are balanced; consequently the industry anticipates further declines and little improvement for several weeks. One bright spot, however, is the possibility that automobile and truck manufacturers will be taking large trial lots of steel during May for 1940 models.

Footwear manufacturers have been rushed on their Easter-trade orders, and March production figures, like those of February, are expected to be the second highest on record for the month; but output for the rest of 1939 is expected to compare less favorably with 1938 than did the first quarter of this year. Preparations have been proceeding slowly for production of summer footwear.

Vulcanized Rubber Co., Morrisville, Pa., continues to run normally. President Stanley H. Renton was on a business trip to Washington.

Hohwieler Rubber Co., Morrisville, Pa., is operating to capacity on spring and summer sporting goods. President William Hohwieler expects business to continue fairly good, judging from orders on hand.

Hewitt's 80 Years

Hewitt Rubber Corp., Buffalo, N. Y., manufacturer of hose, conveyer, bucket elevator, and transmission belting, packings, and other molded and sheet rubber items, is celebrating the eightieth anniversary of the founding in 1859 of the Gutta Percha & Rubber Mfg. Co., Hewitt parent company, which made the then-popular gutta percha ornaments. Warren & Spadone, manufacturing jewelry concern in New York, sensing the possibilities of crude rubber and anxious to meet the demand, expanded rapidly, and their discoveries were so great that the making of jewelry was soon abandoned. From the start the Gutta Percha company also manufactured fire hose.

In 1904, Herbert H. Hewitt founded the Hewitt Rubber Co., confined to the manufacture and sale of products for railroads. Rubber then found new uses in other fields and the manufacturing lines of Hewitt became more diversified. In 1926, Hewitt acquired the Gutta Percha & Mfg. Co., changed the name in 1927 to Hewitt-Gutta Percha Rubber Corp., and in 1933 to Hewitt Rubber Corp.

Outstanding in the success of the Hewitt corporation are the activities of its research laboratory, under the direction of Michael Berman, which with the assistance of his associates, including William Brockner, production superintendent, resulted in many uses of synthetic rubber and the invention of "Twinweld" hose for oxy-acetylene welding.

The present plant consists of seven buildings containing 205,000 square feet of manufacturing floor space and employs approximately 500 men and women.

Hewitt products are sold to more than 100 separate industries throughout the United States, Canada, Mexico, and overseas. In the United States the company has about 200 distributers and 33 factory representatives.

The following comprise the Hewitt management; each officer has been with Hewitt ten years or more: Thomas Robins, Jr., president; Earle K. Twombly, vice president and treasurer; F. G. Cooban and F. E. Miller, vice presidents; W. S. Carleton, vice president, in charge of Eastern Division; L. D. Bigelow, vice president, in charge of Western Division; and J. H. Hayden, secretary.

In celebration of its birthday Hewitt is issuing a company magazine. The first number lists all workers in the plant.

Hewitt is expanding its Dallas, Tex., warehouse facilities because of increasing demands and growth. On April 1, 2,600 additional square feet of floor space were added, making a total 7,500 square feet.

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., in its recent annual report to stockholders by President George H. Carnahar announced that production of guayule rubber was continued throughout 1938 at the company's Catorce and Cedros factories, but the Torreon factory had been closed since January 28. None of the shrub milled at Cedros came from Cedros Hacienda, but, like Catorce supplies, was purchased from tributary or neighboring ranches. No shortage of available raw material is now in sight for either plant, and regrowth on harvested areas nearer to the factories as fostered by the company's methods of exploitation is meanwhile progressing satisfactorily. The Torreon factory is kept ready to resume production on short notice, but reopening this year is subject to many uncertainties. However the available supply of raw material tributary to Torreon is excellent and continues to improve. The Supreme Court of Mexico has not yet rendered a decision to clear up the legal situation involving the ownership of a substantial portion of Cedros Hacienda.

Dr. W. B. McCallum, chief botanist of the Intercontinental Rubber Co., who has been with the company since 1910 and is known as "the father of cultivated guayule," has been in Italy and her colonies on his company's business since October and is expected to return to his headquarters at Salinas, Calif., in the near future.

Foster D. Snell, Inc., firm of chemists and engineers, 305 Washington St., Brooklyn, N. Y., held its annual dinner on March 3 at the Brooklyn Club, with 27 present. Dr. Snell introduced the guest speaker, Dr. Walter S. Landis, vice president of the American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., who conducted a word tour through the Union of South Africa, where he has spent some time on business, and also discussed the situation in Central Europe, which he has also visited.

Charles Slaughter, president of Commodity Exchange, Inc., and of Slaughter, Horne & Co., both of New York, N. Y., on April 15 returned home after a trip around the world, begun last October, made primarily for pleasure, but during which he collected several first-hand impressions about the commodities traded on the exchange of which he is now head. Upon his return Mr. Slaughter stated that publication of open interest figures for the commodities traded on the Commodity Exchange will begin May 2, to be posted daily on the floor of the exchange shortly after 11:00 a.m. after receipt of the figures from the various clearing house associations.

A.S.T.M. Annual Meeting

The forty-second annual meeting of the American Society for Testing Materials will be held at Chalfonte-Haddon Hall, Atlantic City, N. J., from June 26 to 30, inclusive. At the same time there will be in progress the Fifth Exhibit of Testing Apparatus and Related Equipment in which a number of manufacturers and distributers of testing and scientific instruments will participate and a number of the society's committees and research institutions will sponsor special displays of interest in the engineering materials fields.

New A.S.T.M. Publication Plan

American Society for Testing Materials, because of the great growth of its standardization work, has announced important changes, effective November, 1939, in the methods of publishing its standard specifications and tests. The major change is to combine the Book of Standards, issued triennially, and the Book of Tentative Standards, issued annually, into one volume of standards and tentative standards, issued triennially, to be divided into three parts: Part I, Metals; Part II, Non-Metallic Materials—Constructional; and Part III, Non-Metallic Materials—General, which will include electrical insulating materials, rubber, textiles, plastics, and general testing methods. Publication of new and revised tentative standards in the annual "Proceedings," Part I, will be discontinued; the "Proceedings," including both committee reports and papers, will be bound in one volume. Publication of the annual Book of Tentative Standards will be discontinued entirely. In the two years between triennial publication of the new Book, Supplements to each of the three parts will be issued, containing revisions and new or revised standards and tentative standards for that year.

All of the 870 A.S.T.M. standards are in widespread use in many branches of industry and commerce. Each is available and will continue to be in separate pamphlet form.

Further details of the publication plan can be obtained from the society's headquarters, 260 S. Broad St., Philadelphia, Pa., including sales prices established for the new Book of Standards, 1940-41 Supplements, and the annual "Proceedings."

Hercules Powder Co., Wilmington, Del., plans to move its New York, N. Y., office from 22 E. 40th St., to 500 Fifth Ave.

Lee Tire & Rubber Co., Conshohocken, Pa., on April 12 elected to the presidency Albert A. Garthwaite, succeeding the late John J. Watson. Mr. Garthwaite, for the past 12 years vice president, treasurer, and general manager of the company is succeeded as treasurer by the assistant treasurer, Wm. B. Dunlap.

1939 Toy Fair

The 1939 American Toy Fair, world's largest exhibit of toys, was held in New York, N. Y., under the sponsorship of the Toy Manufacturers of the U.S.A., Inc., from April 17 to 29. Occupying seven acres of floor space at the Hotel McAlpin and the Fifth Ave. Bldg., this year's fair presented more than 10,000 new toys produced in 30 different states. Other displays were shown at 1107 Broadway and at other locations throughout the city.

By providing designs of interest and purpose, both requirements of the modern toy, rubber manufacturers, who numbered approximately 20 at the fair, have enhanced the play value of their products. Interest in rubber toys was reflected in the high volume of sales reported during the fair. In addition to design improvements in existing rubber toys, many new products were on display, including: a new pitch-toss game utilizing molded rubber characters and rubber rings; a feathered multi-purpose game ball similar to a badminton shuttlecock; a rubber-covered metal hoop; the Goofy ball, a hollow rubber ball with an angular bounce; a bouncing stick with sponge rubber balls at the ends of a wooden stick; complete Pliofilm wardrobe for dolls; rubber whistles to replace small metal whistles on hollow items; a cat's head which mews upon slow rotation; thin-walled animal characters made of latex; twill finish bathing cap; steam-cured bladderless beach balls and swim rings; table hockey game with rubber puck; toss-up balloon with a wheeled platform for pulling; and three-in-one balloon incorporating spiral, knobby, and ringer designs. Among the new molded items are Walt Disney's Pinocchio characters; the comic strip characters Henry and the King; Kitty-Be-Mew; and a baby giant panda. Rubber also is finding many new applications in the fabrication of other toys and sports equipment.

Rubber exhibitors at the McAlpin were: Anderson Rubber Co., Akron, O.; Auburn Rubber Corp., Auburn, Ind.; Goosmann Mfg. Co., Grand Rapids, Mich.; Hobby-Craft, Inc., Chicago, Ill.; Infant Toys Co., Inc., New York, N. Y.; Lee-Tex Rubber Products Corp., Chicago, Ill.; Pennsylvania Rubber Co., Jeannette, Pa.; Seamless Rubber Co., Inc., New Haven, Conn.; Seiberling Latex Products Co., Akron, O.; Sun Rubber Co., Barberton, O.; and C. B. Webb Co., Lebanon, Pa. At the Fifth Ave. Bldg. were: Barr Rubber Products Co., Sandusky, O.; Frederick H. Beach, 200 Fifth Ave., New York, N. Y.; Fulton Specialty Co., Elizabeth, N. J.; Ideal Novelty & Toy Co., Long Island City, N. Y.; Paragon Rubber Corp., Easthampton, Mass.; Schavoir Rubber Co., Springdale, Conn.; and Superior Type Co., Chicago, Ill. The Oak Rubber Co., Ravenna, O., had its exhibit at its showrooms in Newark, N. J.

Thomas H. Young

U. S. Rubber Co.

United States Rubber Co., 1790 Broadway, New York, N. Y., reported to the Securities and Exchange Commission that its holdings in the Sampson Corp., Los Angeles, Calif., as of February 28, 1939, totaled 158,188 shares of the 161,731 outstanding shares of $10 par non-cumulative 6% preferred stock and 44,584 of 48,055 outstanding shares of no-par class B stock.

New Advertising Director

Thomas H. Young, sales development manager of the company's footwear and clothing division, has been appointed advertising director of U. S. Rubber, according to F. B. Davis, Jr., president. Mr. Young succeeds Walter Emery, appointed to the newly created post of economist for the company.

Mr. Young joined the company in 1916 and remained with it continuously except for about a year and a half, during the World War, when he served in the United States Army. His first position with the company was in charge of the Trade Record Department of the then Tire Division, which subsequently became the Sales Promotion Department. Rejoining the company after the war, he developed the Sales Promotion Departments of the Footwear, Clothing and General Products and Mechanical Goods divisions. Next, Mr. Young was made sales manager of a distributing branch, directing the sales of footwear, clothing, and general products. He returned to the general office in 1927 as advertising manager of the Footwear Division. In 1930 he became assistant to the general sales manager of the Footwear, Clothing, and General Products Division; in June, 1935, however, he was named sales development manager of the division and also supervised the advertising and sales promotion of its products.

The Rubber Manufacturers Associa-

(*Continued on page* 58)

NEW ENGLAND

FACTORY operations in New England have inclined toward contraction since mid-March: orders have been somewhat declining; so has production. One industry reports business unusually dull; while others are fairly well satisfied. Textile mills operating at about 80% capacity; while southern manufacturers have been slightly higher.

Showing increases of 56.8% in electric power usage and 30.1% in payrolls during March, over March, 1938, the manufacturing rubber industry in Rhode Island began the second quarter of 1939 in a more satisfactory and encouraging position and with a more optimistic outlook than has existed in a long time. There were increases of 3.9% in payroll disbursements and 9.3% in electric power usage by the rubber trades in March over February. In contrast to 1938 the sales curve in the rubber industry points upward while stocks of raw materials and finished goods are reported comfortably low.

Latex Food Wrap

Cryo-Vac, a transparent latex bag made by the Dewey & Almy Chemical Co., Cambridge, Mass., is a new wrap for quick-frozen foods, including meats, that affords protection against "freezer burn" and drying out during freezing and storage. The bag is odorless, imparts no taste, and is moisture- and vapor-proof. To wrap a chicken, as an example, the bag is enlarged by stretching the mouth over the top of a special wide-mouthed can, and by a vacuum the bag is drawn in to conform to the shape of the can. The distended bag is chilled so that the rubber becomes frozen, maintaining the bag in the enlarged shape. After the chicken is dropped inside the bag, the air is evacuated from within the wrap. The opening is then sealed, and by quick immersion into warm water the stretched rubber "thaws out," the wrap contracting to a taut, transparent "second skin" around the chicken.

In addition to preventing the evaporation of natural juices during freezing and storage, faster and more economical freezing is permitted because the foodstuff is completely protected during the process. As the Cryo-Vac bag provides a lustrous, transparent covering, the consumer appeal of the meat is also enhanced.

M.I.T. Course on Colloids

The Massachusetts Institute of Technology, Cambridge, Mass., has announced the fourth summer program in theoretical and applied chemistry and physics of matter in the colloidal state to be held under the direction of Dr. E. A. Hauser, for five weeks beginning July 24. Communications should be directed to Dr. Hauser at the institute.

Hood Rubber Co., Inc., Watertown, Mass., according to C. L. Münch, vice president in charge of sales, last month leased a six-story building at 120 Franklin St., New York, N. Y., to be used as a branch and warehouse for the sale and distribution of rubber and canvas footwear by both Hood and its Goodrich footwear division. The structure, which contains about 38,000 square feet and has frontages on West Broadway and Franklin St., will be extensively altered. Irving B. Wells, Hood district sales manager with headquarters in New York, recommended and negotiated this change from old quarters at 148 Duane St. in order to provide a more convenient location for customers as well as to secure decidedly improved facilities for receiving, storing and shipping merchandise and for sales offices.

Later Treasurer A. C. Brett announced that the company had also leased the five-story and basement building at 21-27 Burlington Ave., Boston, Mass., for warehousing and shipping purposes. The structure contains 200,000 square feet, is located in the Back Bay district, and is served by the Boston & Albany Railroad.

The Federal Rubber Co., Chicopee Falls, Mass., has filed statement at the office of the Secretary of State of Rhode Island that Edward M. Brennan, attorney, 10 Weybosset St., Providence, is the corporation's legal representative in Rhode Island.

United States Rubber Co., New York, N. Y., is making extensive alterations and improvements at its plant on Valley St., Providence, R. I.

Fisk News

The New York regional conference of dealers and branch managers of the Fisk Tire Co., Chicopee Falls, Mass., was recently held at the Park Central Hotel, New York, N. Y., under the guidance of B. H. Bowen, local branch manager of the Fisk organization. Present from the main plant were H. W. Sherlock, merchandise manager; C. E. Maynard, factory manager; A. E. Benson, product development manager; C. E. Steele, commercial tire sales department; and H. R. Hurd, advertising manager.

For Greater Tire Mileage with No Added Cost

Increased tire mileage at no extra cost may be secured by motorists if they will change tire positions every 5,000 miles, according to Fisk engineers, who advise moving both front tires to corresponding rear positions and crossing the rear tires diagonally so that the left rear is on the right front and the right rear is on the left front. Another method of assuring even wear is to reverse the position of the front tires before they are mounted on the rear wheels. This changes their running direction and compensates for the wearing action on the individual tread units. The rear tires are automatically reversed when their position is changed. Changing tire positions equalizes uneven wear from camber, caster, and toe-in action of a car and results in smooth, even wear on all four tires.

View of New Fisk Plant at Viskafors, Sweden

OHIO

THE immediate outlook seems bright for increased activity in the Akron tire center. A recent Dun & Bradstreet survey of the rubber goods industry reveals that in contrast to 1938 at this time, 1939 finds the sales curve pointing upward, with stocks of both raw materials and finished goods comfortably low. Reduced labor cost per dollar value of output and the recent increase in tire prices, making them the highest since June 1928, contribute to a substantial improvement in earnings compared with 1938. The trade estimates a 10 to 15% increase in tire shipments this year, but foresees the possibility of a decline in export demand, with these sales, however, normally amounting to less than 2% of total shipments. By careful control of purchase and output the industry improved its statistical position last year despite the sharp slump in sales. Inventories of manufactured products were also curtailed; while the favorable winter resulted in an unusual reduction in manufacturers' and distributers' holdings of rubber footwear. Failures among rubber companies, wholesale, retail, and manufacturing, have increased so far this year in comparison with 1938, totaling 15 for the first quarter of 1939, against 31 for all of 1938.

Goodyear Activities

The Goodyear Tire & Rubber Co., Akron, on March 27 held its annual meeting of stockholders at which President Paul W. Litchfield stated that the immediate outlook for 1939 is moderately favorable and unless unforeseen events should intervene the company is confident that its sales volume should show a substantial improvement over 1938. To solve satisfactorily the problem of assuring an adequate supply of crude rubber in the event of war, Mr. Litchfield recommended that as a means whereby a reserve stock of crude rubber be accumulated without incurring any great expense or upsetting markets, the United States Government exchange its cotton, totaling more than eleven million bales, which it has been holding after purchase or acceptance as collateral for loans to cotton producers, for rubber from the rubber-growing areas controlled by Great Britain and Holland.

Mr. Litchfield was reelected president for the fourteenth consecutive year by the board of directors following the stockholders' meeting. All 17 directors were continued in office, and other executives of the company were also reelected as follows: E. J. Thomas, executive vice president; R. S. Wilson, P. E. H. Leroy, C. Slusser, C. A. Stillman, vice presidents; Z. C. Oseland, treasurer; W. D. Shilts, secretary; C. H. Brook, comptroller; H. W. Hillman, assistant treasurer; F. R. Wahl and W. M. Mettler, assistant secretaries; C. L. Weberg, H. D. Hoskin, and H. J. Young, assistant comptrollers.

Employe Data

The directly employed personnel of Goodyear numbers 45,000: 40,000 have been with the company for more than five years, 22,000 for more than 10 years, 6,000 for more than 20 years, 800 for 25 years or longer. The average length of service in the Akron plant is 17 years. The average age of Akron factory employes is 44 years. During the past 15 years Goodyear has paid out $680,879,000 in wages and salaries. Nearly 300,000,000 tires have been built by this group since the company was organized 40 years ago.

New Appointments

Henry T. Gillen, because of ill health, is relinquishing the post of Plant 1 superintendent to become consulting superintendent. He is succeeded by Harry I. Belknap, long of Development, Technical Service, and Tire Design, and superintendent of the Java plant from 1934 to 1938.

Malcolm G. Anderson, of development, is leaving for England to take charge of that department in British-Goodyear, succeeding H. A. Brittain, recently appointed superintendent there.

Second National Farm Essay Contest

Goodyear once again is sponsoring a farm essay contest among high school boys who are students of vocational agriculture. Theme of the essay this year is "Farming of Tomorrow on Rubber." The 10 boys who submit the best manuscripts will be awarded all-expense-paid trips to Akron, plus a week's outing at President Litchfield's Timagami, Ont., Canada, lodge.

Award of $100 in cash will be made to the high school attended by the contestant whose manuscript is considered the best. Closing date of the contest is May 15; announcement of prize winners will be made about June 15, and the trip will be made during August.

Master Tire & Rubber Corp., which comprises the Cooper Corp., the Giant Tire & Rubber Corp., and the Falls Rubber Co., all of Findlay, held an organization meeting on March 25 at which all officers and directors were reelected for another year as follows: president, J. F. Schaefer; vice president and secretary, C. E. Hart, vice president in charge of production, W. B. Brewer; treasurer, G. W. Lishawa; assistant secretary, E. D. Marvin; directors, I. J. Cooper, W. A. Hollington, and P. W. Ewing. Mr. Schaefer reported that Master sales last year were 37½% higher than in 1937 and indications are that this year's business may go even higher. A satisfactory profit was made in 1938, and business conditions for 1939 are encouraging.

Mansfield Tire & Rubber Co., Mansfield, has filed a registration statement with the Securities and Exchange Commission covering a proposed offering of 47,615 common shares and naming Otis & Co., Cleveland, as underwriter. Of the shares 13,800 are being purchased from the company and 33,815 from present shareholders. Public offering price will be $15.50 a share. Proceeds of the shares to be bought from the company will be used to reimburse it for expenses incurred in adding to its plant facilities. The company also reported gross sales for the first two months of the current year were substantially higher than those of the same period of previous years.

R.C.A. Rubber Co., 1833 E. Market St., Akron, manufacturer of rubber flooring, wall covering, mats, stair treads, and automotive specialties, for last year reported sales approaching $500,000. Executives include C. E. Reiss, president and treasurer; J. E. Smith, vice president and factory manager; and C. M. Wernig, sales manager.

Goodrich News

Some time ago a nation-wide search was conducted for the originator of the center traffic safety line on highways by The B. F. Goodrich Co., Akron, and the honor was awarded to the late Edward N. Hines, of Detroit, vice chairman of the Wayne County Board of County Road Commissioners, whose origination of the white center traffic stripe was in 1911.

However Alexander L. H. Darragh, of Chicago, has submitted a photograph of a section of old highway between Mexico City and Cuernavaca, Mexico, built under the Spanish regime 350 or 400 years ago, which clearly shows a "white stripe" in use even then. This stone road, many sections of which are in service today, has a "built-in" center line of light stones.

Personnel Changes

Robert E. Hower, formerly truck and bus tire manager in the Los Angeles district, has been made Pacific Coast representative of the company's original equipment division, with headquarters in Los Angeles, according to G. E. Brunner, Goodrich sales official.

James S. Bonner recently was assigned to handle sales of Koroseal products to the textile industry in North and South Carolina, with headquarters at 712 Louise St., Charlotte, N. C., succeeding Robert L. Hart, recalled to Akron for other duties.

Karl Pechmann recently resigned from the Goodrich organization to become production chemist in the synthetic organic chemistry department of Eastman Kodak Co., Rochester, N. Y.

MIDWEST

TRENDS varied in industrial output in the Midwest, with both increases and recessions recorded. But here again current conditions are better than experienced in corresponding months of 1938. For the rubber industry 34 firms reported 17,933 wage earners receiving $481,000, a 1.9% gain in employes, but an 0.8% drop in earnings from the previous month.

Automobile production was curtailed somewhat recently to keep in step with retail demand and to prevent an increase in inventories; consequently output increases have been less than seasonal. The Automobile Manufacturers Association reports factory sales of motor vehicles for the first quarter of 1939 reached 1,055,787 units, a gain of 58% compared with the corresponding period in 1938, when 668,346 units were sold. The industry feels, however, that sales in April and May will top those of March, but that second-quarter production will not greatly exceed that of the first quarter of 1939.

N.A.W.M.D. Convention

The National Association of Waste Material Dealers, Times Bldg., New York, N. Y., held its twenty-sixth annual convention at the Hotel Sherman, Chicago, Ill., March 20 to 22. A new name for the association was the subject for discussion at the opening session. This matter will be studied and brought up at a later meeting. On Monday night a get-together party, featuring entertainment and a buffet supper, was attended by approximately 400 delegates who took this opportunity to get better acquainted with each other. At the annual meeting on the closing day of the convention Harry S. Goldstein was elected president of the association, following which Mr. Goldstein delivered a forceful address pledging himself to uphold the high standards set by his predecessors. Louis Lippa was elected first vice president, and Paul J. White, second vice president. Chas. M. Haskins was reelected secretary-treasurer. The convention was concluded with the annual banquet, a successful affair at which members heard Clifton M. Utley thoroughly review present conditions in Europe.

Members of the Scrap Rubber Institute, a division of the association, met on March 22. The session was given over to discussing proposed changes being made by the Rubber Reclaimers Association in their classification circular. Nat E. Berzen and Julius Muehlstein were elected president and vice president of the Institute respectively.

Monsanto Chemical Co., St. Louis, Mo., recently held its annual meeting of stockholders at which the present board of directors was reelected. President Edgar M. Queeny announced that although the sales and profit position of the company have improved thus far this year, the continued uncertainty of world conditions and what the federal government is going to do to business and industry makes it impossible to forecast ahead.

NEW JERSEY

MANUFACTURERS were disappointed when they found little change in business conditions during the early spring after expecting an upward trend. Some companies were adversely affected by a recent reduction of 5¢ per gross in the price for jar rings which came after the major portion of the supply for summer trade had been produced.

Pierce-Roberts Rubber Co., Trenton, is now operating with but one shift because of a decline in business.

Acme Rubber Mfg. Co. and **Puritan Rubber Co.,** both of Trenton, note an improvement in business since last month.

The 1939 National Safety Congress and Exposition will be held in Atlantic City, N. J., October 16-20. The Safety Congress is the annual meeting of members and committeemen of the National Safety Council, 20 N. Wacker Dr., Chicago, Ill., and brings together approximately 10,000 safety leaders from all parts of the world. This year there will be 130 sessions and 600 speakers at the congress, touching on every phase of safety—industrial, traffic, home, school, and public.

L. Albert & Son, supplier of rubber machinery, reports its plants at Trenton, N. J., and Akron, O., are running to full capacity with a greatly increased output. I. H. Albert, company executive, recently returned from a trip to the Midwest and West Coast.

Crescent Insulated Wire & Cable Co. and **Nearpara Rubber Co.,** both of Trenton, report a downward trend in business.

Lawrence Oakley, of Essex Rubber Co., Trenton, recently returned from a week's business trip through New England. Hans Brunner, factory manager, is spending several weeks in Europe and will visit his native town in Switzerland.

Pocono Co., Trenton, is operating normally.

The Martindell Molding Co., Inc., capitalized at $125,000, has let a contract for a new factory, 50 by 125 feet of one and two stories to cost $20,000, in Ewing Township, near Trenton, to manufacture molding and plastic rubber. Semi-automatic presses and other equipment will be installed, and the plant will begin operations about June 1. This will be the first unit, and other additions will follow. The directing head will be Milton H. Martindell, formerly with Jos. Stokes Rubber Co., Trenton, for 32 years. Godfrey Zentmayer, formerly with Battle & Co., investment broker, is vice president. An engineer with 20 years' experience in the molding and plastic industry has also been engaged.

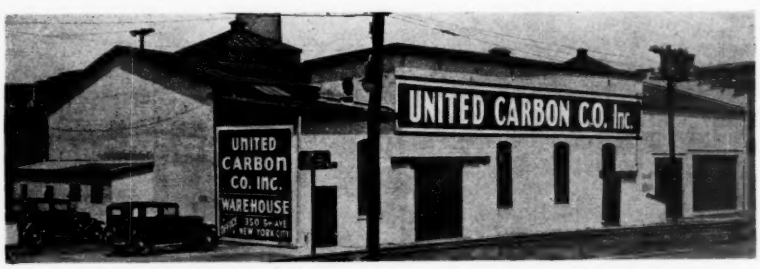
Luzerne Rubber Co., Trenton, finds business holding up for this reason of the year. President Bruce Bedford and Mrs. Bedford spent two weeks cruising in the West Indies.

Canada

Industrial Accident Prevention Associations, Toronto 2, Canada, held its annual safety convention and safety exhibit on April 17 and 18 in the Royal York Hotel, Toronto. Among the speakers was Cyrus S. Ching, director of industrial and public relations, United States Rubber Co., 1790 Broadway, New York, N. Y., who discussed "Today's Trends."

Laboratory Paint

Fillox enamel for general use in chemical laboratories is a composition based on non-oxidizing, non-saponifying urea resins. It contains no nitrocellulose or oil soluble compounds and is made in ten different colors. Applied by brush or spray methods, Fillox dries quickly to a smooth, glossy finish, highly resistant to corrosive chemicals, moisture, and fumes.



United Carbon Co.'s New Warehouse at Lister Ave. and Brown St., Newark, N. J., Which Will Serve the Rubber Industry in the Territory Surrounding New York, N. Y.

Rubber Industry in Far East

JAPAN

Efforts of Japanese industrialists to produce synthetic rubber have been much publicized, and many firms are reportedly engaged in actual commercial production. But a report by the Department of Commerce and Industry shows actual output in 1938 was only 100 metric tons.

Rubber goods exports dropped from 52,512,851 yen in 1937 to 34,334,258 yen in 1938. The most important decreases were in footwear and tires and tubes. The former declined 41.3% in value and 41% in quantity in 1938, from 1937, and the latter 40% in value and 41% in quantity. Other rubber goods declined 11% in value.

The Bridgestone Tire Co. expects by summer to have finished transferring all equipments at its new Totsuka plant near Yokohama to the Tsingtao plant wrecked during the hostilities, a recent Osaka trade report states. The company is further understood to be planning the erection of a plant for reclaiming rubber and another for making rubber-soled tabi at Shanghai.

INDIA

With the construction of a large tire manufacturing plant near Bombay, India, it is probable that manufacturers in other countries which sell tires to India will in the future be practically shut out of that market, according to a report of the Department of Commerce from the office of the American Commercial Attache at Calcutta. With the completion of this new plant it is estimated that more than 80% of the market requirements will be manufactured locally. Domestic production at present is confined entirely to a plant near Calcutta, and it is estimated that about 50% of the present tire sales in India is of local manufacture. So far as American manufacturers are concerned, the outlook for a sizable or profitable import tire market in India is not very bright and it cannot be said that other countries enjoy a much better position, the report stated.

It is estimated that over 2,000,000 bicycles are in use daily in India, which afford a good tire market, but all bicycles used in India require a 28- by 1½-inch tire and tube. Single tube tires have not been introduced in this country, but have followed the English and Continental designs. It is estimated that the market consumed about 1,800,000 tires in 1938, of which about 1,400,000 were of domestic manufacture.

NETHERLAND INDIA

Crude rubber exports from Netherland India in January, 1939, totaled 39,272 tons, against 26,862 tons in January, 1938, according to the Central Bureau of Statistics. Estate rubber from Java and Madoera totaled 7,010 tons, and from the Outer Provinces, 11,014 tons with native rubber from the Outer Provinces at 21,248 tons. The stocks of native rubber in the hands of recognized dealers at the end of January, 1939, came to 14,845 tons, against 18,000 tons on January 31, 1938.

Several companies report forward sales out of the 1940 crop. These include Cultuur Mij. Pasir Karet, which recently sold forward a further 30 tons of standard sheet for delivery over January-December at a price of 30 guilder cents per half kilo. This brings the total forward sales of this company for that year to 120 tons. Rubber Cultuur Mij. Kawang also sold another 30 tons standard sheet at 30 guilder cents, totaling 120 tons out of the 1940 crop. Cultuur Mij. Sindang Sari sold 30 tons at 30 guilder cents, in addition to previous sales of 30 tons at 29¾ guilder cents. Rubber Cultuur Mij. Hambalang sold 60 tons at 29¾ guilder cents and 60 at 30 guilder cents, in all 120 tons; while Cultuur Mij. Goenoeng Anaga sold 30 tons for January-December delivery at 30 guilder cents.

MALAYA

Permission to carry larger stocks of rubber during the period of low export quotas creates a storage problem. J. D. Hasting and J. H. Piddlesden discuss[1] means of preventing the formation of mold during storage. The use of paranitrophenol is recommended as the most suitable chemical preservative. Usually a 1% stock solution is made, which is either mixed with the latex before coagulation in the proportion of one gallon of solution to 60 gallons of diluted latex, or it is used as a bath in which the freshly machined sheet is soaked. The former method gives very good protection against mold, but is more expensive as it requires one pound of paranitrophenol for 900 pounds of rubber against one pound of paranitrophenol per 2,000 pounds of rubber by the second method. However the use of paranitrophenol makes the rubber more sensitive to heat; smoke-house temperatures must, therefore, be carefully controlled especially in the early stages of drying and in the case where paranitrophenol has been incorporated in the latex. The lower temperature causes slower drying, but this may offer an added advantage as it tends to produce a darker sheet more resistant to mold attacks.

It has been decided that Dunlop Plantations, Ltd., can be better managed in Malaya because of the close technical control required. Consequently the administration and control of the company has been transferred from London to Malaya, and a new company, Dunlop Malayan Estates, Ltd., was formed for the purpose. The directors of the concern, which has been registered in Malaya, are: A. H. C. Allen, at present member of the executive staff of Dunlop Plantations, Ltd., in Malaya; F. D. Ascoli; Robert Burns, of Evatt & Co., Singapore; R. B. Carey, of the executive staff of Dunlop Plantations; Francis Stuart Gibson, chairman of Mansfield & Co., shipping agent, Singapore; R. Williamson, Drew & Napier, solicitors, Singapore; and G. Wiseman, at present resident director of Dunlop Plantations, Malaya. Mr. Ascoli has already left for Malaya.

[1] *J. Rubber Research Inst. Malaya*, Nov., 1938.

OBITUARY

(*Continued from page* 50)

Funeral services were held April 26 at Christ Church, New Brunswick, N. J.

Rudolf Ditmars

RUDOLF DITMARS, 61, died suddenly at Graz, Germany. Dr. Ditmars was well known, especially before the World War, as rubber investigator and teacher. After having obtained his doctor's degree in chemistry in 1902, he began to devote himself exclusively to rubber research and in 1905 established a laboratory at Graz with a Rubber Chemistry School attached. Dr. Ditmars was keenly alive to every new development in rubber, and he early recognized the importance of colloid chemistry in relation to rubber, balata, and other plastics. Indeed he was for a time in charge of the periodical *Kolloidzeitschrift*. It was he who discovered that practically all vat dyes resist vulcanization. Among the various works from his pen may be mentioned "The Analysis of Rubber, Guttapercha, Balata and Their Ingredients," "The Synthesis of Rubber," "Technology of Rubber," and "Rubber."

Rubber Industry in Europe

GREAT BRITAIN

Rubber Trade Board

The Minister of Labor has established a Trade Board for the Rubber Manufacturing Trade in Great Britain under the Trade Board Acts, 1909 and 1918. All branches of the Rubber Manufacturing Trade as defined in the Trade Boards (Rubber Manufacturing) Order 1938 will be subject to the jurisdiction of the board with the exception of the small branch concerned with the regeneration of used or waste rubber, for which a separate board is to be established. After consultation with the organizations of employers and workers connected with the Rubber Manufacturing Trade, the minister appointed as members of the board 3 neutral members, 15 representatives of employers, and 13 representatives of the workers.

Rubber-Covered Gas-Tanks

In France and Italy gas tanks on aircraft, torpedo boats, and tanks are in use having a special rubber covering to protect them against machine-gun bullets, and the *Times* learns that the British Government is considering their adoption. The tanks, it appears, are coated with aerated rubber, full of isolated bubbles, over which is a layer of vulcanized rubber and finally a skin of doped fabric.

Because of the elasticity of rubber and its solubility in gasoline, a hole resulting from a bullet is automatically sealed by the leaking gas swelling the rubber. The rubber cover also absorbs some of the strains on the tank, permitting thinner gage metal with the result that the rubber-covered tank weighs little more than an ordinary tank.

Bus Tire Mileage

Service of 150,000 miles before retreading is recorded for a London bus tire, a recent investigation by the London Passenger Transport Board revealed. Many have covered 140,000 miles; while 80,000 miles is common. All tires are re-grooved and, where practical, retreading adds 50% to the life of the tire.

Notes

G. G. Balazs, recently of California, succeeds I. D. Patterson as chief chemist at the Goodyear factory, Wolverhampton. He will also take the place of Mr. Patterson, who left for America in February, on the Midland Section Committee of the Institution of the Rubber Industry.

Deposition of Rubber on Wool

Supplementing the reference in our April issue to the paper by Dr. C. M. Blow, of the Wool Industries Research Association, on the deposition of rubber on wool, the dilute latex, from which deposition is made, is modified by addition of "cationic" soap compounds so that the charge on the particles becomes positive instead of negative. Usually 5 to 15% of rubber by weight is applied to the textile. Yarns can be processed in hank or on cheese, and it is also possible to apply the treatment to fabrics.

The rubber, present as a partial coating on the fibers and not as a continuous film throughout the yarn or fabric, binds the fibers together and reduces their ability to move. In a soft twist yarn the rubber reduces the slippage of the fibers and increases the strength to equal or exceed that of a hard-twisted yarn. But whereas the hard-twisted yarn has lost to a large extent its fullness and loftiness, the rubberized soft-twist yarn (of the same strength) has not.

The method, suitable also for carded webs, produces a "felt" with good handle and high strength without the necessity of milling, thus permitting the use of low-grade and poor-felting wools.

U. S. S. R.

At the Eighteenth Congress of the Communist (Bolshevik) Party of the Soviet Union industrial progress under the third five-year plan (from 1938 to 1942) was discussed. Not only are the output and quality of synthetic rubber to be raised, but discovery of new types of synthetic rubber and rubber substitutes is to be stressed. By the end of 1942, 13 new synthetic rubber factories are expected, and plantations of native rubber-bearing plants are to be increased with four to six new processing factories. Soviet Russia, it was stated, is already completely independent of imports of gutta percha. Greater use and production of automobiles are envisaged, with more new roads. The erection of 14 new tire factories and seven cord factories is planned.

GERMANY

Leipzig Fair

The Leipzig Spring Fair opened March 5; the section Sample Fair closed March 10, and the Technical and Construction Fairs, March 13. Exhibitors included 9,800 firms and 28 foreign countries with little interest by French, English, and American firms, but a gratifying number of participants from the Scandinavian countries, southeastern Europe, Italy, Poland, Czecho-Slovakia, and Argentina.

The chief attraction in the rubber section was in the many and varied applications of synthetics, especially for non-technical goods. Thus Flugel & Polter show baby panties made of a new, shiny material called "Transparit;" the Niedersachsische Gummiwarenfabrik employs a different product called "Adrettin" for the same purpose and also for sponge bags, sheeting, etc. "Adrettin" is claimed to be resistant to chemicals as well as to tearing, stretching, and cutting. The Continental Gummiwerke A.G., Hannover, demonstrated various applications of its "Schwingmetall," rubber united to metal as patented by the firm, and displayed many articles lined or covered with a new material called "Vulkanit." Synthetic foam rubber is available in two qualities, oil- and non-oil-resistant.

A number of firms featured belting in which the fabric consisted entirely of rayon or so-called cell-wool, impregnated with synthetic rubber.

New Processes

In varnishing rubber surfaces, Walter Munzinger[1] proposes to increase adhesion and facilitate drying by applying first an intermediate coat consisting of an aqueous dispersion of mixtures of rubber and polymerizates of acrylic acid, methacrylic acid, their derivatives, or polyamylacetate, to which softeners may be added. When this coat is dry, the covering varnish is applied.

It has been found[2] that if coke oven gases are specially treated and washed with water, a carbon black with a slow rate of incineration is precipitated which is suitable as a filler for rubber.

[1] D.R.P. 672,291.
[2] D.R.P. 671,632.

Continental's Report

The Continental Gummiwerke A.G., Hannover, made net profits of 5,175,110 marks in 1938, to which was added the carry-over of 1,026,306 marks, and an

8% dividend was declared. In 1938 300,000 square meters were acquired near Hannover where the firm is building warehouses and an up-to-date tire factory equipped for the new, domestic materials.

The company had to cope with higher cost of the new basic materials, higher taxes, higher social levies, and a shortage of labor, although the number of employes was increased by 1,243 to 16,606 persons. Labor saving machinery and more efficient methods of production were introduced.

Exports Permitted

The exportation of phenol, cresol, and synthetic rubber and waste thereof, prohibited on May 20, 1937, is again permitted, effective March 15, 1939, except from Austria and the Sudetenland.

FRANCE

France imported 64,605 metric tons of crude rubber in 1938, against 67,269 tons in 1937, together with manufactured rubber goods amounting to 5,467 tons, value 118,509,000 francs, against 7,311 tons, value 116,716,000 francs. Great Britain, Belgium, and the United States, in that order, continue to be the chief suppliers of rubber goods.

Exports of rubber goods increased in 1938 and totaled 13,321 tons, value 296,783,000 francs, against 12,583 tons, value 234,267,000 francs. The increase was due largely to French colonies; their 1938 figures were 9,029 tons, value 183,058,000 francs, against 7,744 tons, value 135,848,000 francs in 1937. Outside of the colonies, Belgium, Switzerland, and Netherlands are France's best customers. The value of exports to the two latter countries as well as to Syria, Portugal, Brazil, Egypt, and Poland rose sharply in 1938; while shipments to Italy dropped sharply.

Manufacture des Nouvelles Chambres a Air Veil-Picard was recently formed to manufacture inner tubes and pneumatic tires. Headquarters of the new company, capitalized at 4,000,000 francs, are at Levallois-Perret (Seine).

Revue Générale du Caoutchouc on April 6 moved its office from 19 Boulevard Malesherbes, to 9 Avenue Hoche, Paris, 8e, France.

ITALY

Italy proposes to engage in large-scale production of synthetic rubber so as to be self-sufficient as regards rubber some time in 1940. The I.R.I.-Pirelli concern is to erect extensive works in Ferrara in the second half of 1939. In 1938, Italy imported 28,170 long tons of crude rubber, against 24,820 tons in 1937 and 16,534 in 1936. It is reported that the cost of producing synthetic rubber is still too high for commercial tires.

POLAND

The Ardal concern, Lida, which some time ago leased the Pepege factories, has increased its capital from 1,250,000 to 1,830,000 zloty. At present Ardal, the foremost manufacturer of rubber goods, employs 850 persons at Lida and 1,750 at Pepege.

EASTERN

(*Continued from page 52*)

tion, Inc., 444 Madison Ave., New York, N. Y., has announced the launching of a campaign in 34 principal cities throughout the country to eliminate unsafe tires. A similar drive was conducted last summer by tire manufacturers acting through the association. Owing to the great success in local campaigns organized by tire dealers and distributers, it was decided to place the movement this year in the hands of local committees of tire retailers in the principal markets of the nation. The manufacturers will assist in the organization of these committees.

The United States Labor Department, Washington, D. C., announced the awarding of many contracts by Federal agencies including: Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., Navy, rubber packing, indefinite amount; Turner Halsey Co., 40 Worth St., New York, N. Y., Federal Prison Industries, Inc., yarn, $15,976; United States Rubber Co., 1790 Broadway, New York, CCC, fire hose, $12,337 (estimated), War, hose, $11,560. The Navy Department also awarded the following electric cable contracts: Anaconda Wire & Cable Co., 25 Broadway, New York, $66,901; General Electric Co., Schenectady, N. Y., $65,428; Rockbestos Products Corp., New Haven, Conn., $66,790; Collyer Insulated Wire Co., Pawtucket, R. I., $68,774; Habirshaw Cable & Wire Division, Phelps Dodge Copper Products Corp., 40 Wall St., New York, $67,156.

United Carbon Co., Charleston, W. Va., announced that on March 1, W. F. Seegar became general superintendent of operations in its Borger, Tex., territory.

David S. Hunter, advertising manager, A. Schrader's Son Division of Scovill Mfg. Co., Inc., 470 Vanderbilt Ave., Brooklyn, N. Y., and Miss Mary Lowery Alison, of Bayonne, N. J., were married on March 4. Mr. and Mrs. Hunter will reside in the vicinity of New York after their wedding trip.

The Brooklyn-Manhattan Transit System on March 28 sponsored the initial run of its new rapid transit car, which was described on page 39 of our March issue. More than 100 industrial executives, civic and transit officials, newsmen, and photographers ate a four-course luncheon abroad the car as it made its maiden trip around New York. Among those present were Col. David M. Goodrich, chairman, and Arthur B. Newhall, executive vice president, of The B. F. Goodrich Co., Akron, which supplied the 1,009 rubber parts in use on the train; and S. C. Stillwagon, editor, India Rubber World. The car is eighty feet four inches long, ten feet wide, weighs 76,000 pounds, and costs about $500 a lineal foot as compared with $700 for the conventional-type cars.

L. G. Highnote, formerly secretary-treasurer of the Bell Rubber Co., Inc., Dallas, Tex., recently dissolved, has established the Highnote Rubber Co., 1019 Pennsylvania Ave., Dallas. Manufacturing oil field items exclusively, the production will consist of swab cups, packers, rings, and similar mechanical goods. Mr. Highnote is sole owner of the new business and will employ five skilled men who have been associated with him in the rubber industry from three to ten years.

George J. Berger, secretary and general manager, National Association of Independent Tire Dealers, 250 W. 57th St., New York, N. Y., in addressing a meeting of Illinois Tire groups in Chicago on April 10, stated independent tire dealers in about 40 major markets are backing a drive for "fair pricing" of recognized tire brands under the various state trade acts. He also finds the outlook for retail tire sales irregularly better than a year ago. Mr. Berger further stated that recapping or retreading of tires has become increasingly important in the tire industry; consequently dealer groups have been considering standards for this type of work. Although this movement is purely voluntary, some observers hint that if dealers do not take proper precautions, many states may adopt mandatory legislation.

LEGAL

Samson-United Wins Decision

The Court of Appeals for the Second Circuit on April 10 handed down its opinion in a suit of Samson-United Corp., Rochester, N. Y., against Sears Roebuck & Co., Chicago, Ill., holding Samson-United Rubber-Bladed Fan Patent No. 2,095,223 valid and infringed as to all claims in the suit by the rubber-bladed fans manufactured by Excel Auto Radiator Co., Chicago, who defended the suit in behalf of Sears Roebuck & Co.

In speaking of the patent the Court said "the patentee made a valuable contribution to the art which quickly won marked recognition and the patent claims should be construed, if possible, so as to preserve the substance of the patent."

Patents and Trade Marks

MACHINERY

United States

2,151,306. **Tire Bead Winder.** F. J. Shook, Akron, O., assignor to National-Standard Co., Niles, Mich.

2,152,380. **Wheel Machining Apparatus.** F. L. Hall, Cincinnati, O.

2,152,503. **Vulcanizing and Stretching Press.** C. F. Schnuck, New Haven, assignor to Farrel-Birmingham Co., Ansonia, both in Conn.

2,152,755. **Tire Recapping Press.** E. D. Barnes, Seattle, Wash.

2,152,765. **Tire Retreader.** F. E. Kite and L. B. Broering, both of Los Angeles County, Calif., assignors, by mesne assignments, to Tru-Tred, Inc., a corporation of Calif.

2,153,184. **Mold for Hollow Rubber Articles.** J. A. Hagen, Passaic, N. J., assignor to Kaysam Corp. of America, Dover, Del.

2,153,409. **Golf Ball Making Machine.** B. Bogoslowsky, New York, N. Y.

2,153,425. **Apparatus Sensitive to Atmospheric Conditions.** A. T. Mathews, Thomaston, Ga., and C. C. Cadden, Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,154,183. **Vulcanizer.** E. C. Raney, Columbus, O., assignor to Ranco Inc., a corporation of O.

2,154,371. **Tape Forming and Separating Apparatus.** S. W. Alderfer, assignor, by mesne assignments, to Firestone Tire & Rubber Co., both of Akron, O.

2,154,376. **Viscosimeter.** D. C. Cline, assignor to Firestone Tire & Rubber Co., both of Akron, O.

United Kingdom

497,254. **Dies for Molding Rubber.** J. D. Serra.

497,518. **Yarn Coating Apparatus.** R. and J. Pickles.

497,816. **Wood Treating Apparatus.** B. Warsop, and J. C. Day.

497,851 and 498,002. **Adhesive Making Apparatus.** A. and S. Baitz.

498,032. **Tester.** W. H. Tait.

Germany

672,927. **Vulcanizer.** A. Scholz, Coestfeld, Westf.

672,987. **Vulcanizing Press.** L. Herbert, Frankfurt a.M.

673,148. **Tire Gage.** J. Lichtenfeld, Hamburg.

PROCESS

United States

21,043. (Reissue.) **Abrasive Wheel.** B. Sanford and D. E. Webster, assignors to Norton Co., all of Worcester, Mass.

2,152,012. **Fabric Strip.** C. M. Albion, Dorchester, Mass., assignor to Providence Braid Co., Pawtucket, R. I.

2,152,725. **Marking.** J. M. Auzin, Warwick, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,152,826. **Yarn Covered Rubber Filament.** W. M. Spencer, Allentown, Pa., assignor, by mesne assignments, to Filatex Corp., New York, N. Y.

2,153,408. **Golf Balls.** B. Bogoslowsky, New York, N. Y.

2,153,414. **Gaskets.** H. M. Dodge, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,153,525. **Applying Coatings to Rubber, Balata, Etc.** R. J. Snelling, Rochester, assignor to Impervious Varnish Co., Pittsburgh, both in Pa.

2,153,963. **Elastic Products with Textile Basis.** L. S. M. Lejeune, Paris, and E. J. A. Lejeune, Lille, both in France, assignors, by mesne assignments, to Hevaloid Corp., Dover, Del.

2,153,964. **Elastic Fabric.** L. S. M. Lejeune, Paris, France, assignor, by mesne assignments, to Hevaloid Corp., Dover, Del.

2,153,965. **Tires.** L. S. M. Lejeune, Paris, France, assignor, by mesne assignments, to Hevaloid Corp., Dover, Del.

2,153,966. **Power Transmission Belts.** L. S. M. Lejeune, Paris, France, assignor, by mesne assignments, to Hevaloid Corp., Dover, Del.

2,153,967. **Web Cord.** L. S. M. Lejeune, Paris, and E. J. A. Lejeune, Lille, both in France, assignors, by mesne assignments, to Hevaloid Corp., Dover, Del.

2,153,970. **Vacuum Preparation of Compounds.** W. I. McGowan, Cambridge, assignor to Dewey & Almy Chemical Co., North Cambridge, both in Mass.

Dominion of Canada

380,039. **Rubber Foam.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. A. Murphy, E. W. Madge, S. D. Taylor, and D. W. Pounder, co-inventors, all of Birmingham, England.

380,211. **Knitted Fabric.** Hemphill Co., Central Falls, assignee of E. St. Pierre, Pawtucket, R. I., U. S. A.

380,280. **Elastic Strand.** S. C. Lilley, Hamden, Conn., U. S. A.

380,308. **Denture.** F. M. Zull, Valley Stream, L. I., N. Y., U. S. A.

380,550. **Abrasive Wheel.** Norton Co., assignee of B. Sanford and D. E. Webster, co-inventors, all of Worcester, Mass., U. S. A.

United Kingdom

496,902. **Coated Fabric.** F. F. Schwartz and M. A. Chavannes.

497,617. **Rubber Thread.** International Latex Processes, Ltd., and R. G. James.

497,647. **Treating Pile Fabric.** Tootal Broadhurst Lee Co., Ltd., and J. Tankard.

497,652. **Porous Rubber.** J. A. Talalay.

497,696. **Coated Fabric.** F. F. Schwartz and M. A. Chavannes.

497,714. **Glass Fibers.** A. E. Edwards. (Naamlooze Vennootschap Maatschappij tot Beheer en Exploitatie van Octrooien.)

497,788. **Compounding Sheet Materials.** H. D. Minich.

497,796. **Rubber Threads.** American Anode, Inc.

497,848. **Protective Shoe Cover.** B. B. Chemical Co.

497,850. **Battery.** National Carbon Co., Inc.

497,963. **Precipitation of Solutions of Rubber, Bitumen, Starch, Etc.** J. E. Jones, J. Y. Davies, and J. F. Neilson.

498,166. **Coated Fabric.** Dunlop Rubber Co., Ltd., and P. M. Benjamin.

498,649. **Attaching Rubber to Metal.** F. F. Schwartz and M. A. Chavannes.

498,776. **Distilling Rubber.** Wingfoot Corp.

Germany

672,291. **Varnishing Rubber Surfaces.** W. Munzinger, Heidelberg-Rohrbach.

672,398. **Hose.** E. Blochmann, Berlin-Waidmannslust.

672,986. **Rubber Thread.** Metallgesellschaft A.G., Frankfurt a.M.

673,321. **Impregnated Fabric.** Anode Rubber Co., (England), Ltd., London, England. Represented by C. and E. Wiegand, both of Berlin.

CHEMICAL

United States

2,151,839. **Rubber Hydrochloride.** G. B. Cooke, assignor to Crown Cork & Seal Co., Inc., both of Baltimore, Md.

2,152,218. **Coloring Agents.** W. F. Smith, Manchester, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,152,828. **Rubber-Like Reaction Product.** R. M. Thomas, Union, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,153,141. **Rubber-Coal Tar Oil Composition.** K. H. Engel, W. Englewood, N. J., assignor to Barrett Co., New York, N. Y.

2,153,804. **Antioxidants.** P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,153,954. **Plasticized Rubber Hydrochloride.** W. C. Calvert, Chicago, Ill., assignor to Wingfoot Corp., Akron, O.

2,153,962. **Rubber Preservative.** W. M. Lauter, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,153,956. **Antioxidant.** A. M. Clifford, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

Dominion of Canada

380,028. **Antioxidant.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of R. F. Dunbrook and B. J. Humphrey, co-inventors, both of Akron, O., U. S. A.

380,040. **Latex Sponge Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of A. N. Ward and F. T. Purkis, co-inventors, both of Birmingham, England.

380,276. **Puncture-Proof Latex Composition.** J. P. Henry, Cannell, Alta.

United Kingdom

497,402. **Vulcanizable Plasticizer.** F. Rostler and V. Mehner.
497,616. **Colors for Rubber Hydrochloride.** Wingfoot Corp.
497,638. **Synthetic Rubber.** E. I. du Pont de Nemours & Co., Inc.
497,706. **Synthetic Rubber.** E. I. du Pont de Nemours & Co., Inc., and W. W. Triggs.
497,767. **Resinous Condensation Products.** Deutsche Hydrierwerke, A.G.
497,778. **Antioxidants.** C. F. Winans.
497,782. **Lubricants.** Standard Oil Development Co.
497,793. **Positively Charged Latex.** R.P.R. Association, (formerly Rubber Producers Research Association), Wool Industries Research Association, B. H. Wilsdon, and C. M. Blow.
497,841. **Rubber-Like Reaction Products.** G. W. Johnson. (I. G. Farbenindustrie A.G.)
497,862. **Rubber Colors.** Compagnie Nationale De Matieres Colorantes Et Manufactures De Produits Chimiques Du Nord Reunies Etablissements Kuhlmann.
497,908. **Colored Hard Rubber.** American Hard Rubber Co.
497,939. **Antioxidants.** G. W. Johnson. (I. G. Farbenindustrie A.G.)
498,045. **Stabilizer for Latex-Asbestos Mixes.** Y. Cornic.
498,046. **Stabilized Lubricants.** Standard Oil Development Co.
498,053. **Moisture-Proof Coating.** M. F. Monbiot and J. R. E. Stoddart.
498,181. **Fire-Resistant Coating.** British Insulated Cables, Ltd., F. J. Brislee, B. Wright, and L. MacFarlane.
498,302. **Plasticizers for Synthetic Rubber.** V. Bryan, B. J. Habgood, and Imperial Chemical Industries, Ltd.
498,328. **Antioxidants.** Rohm & Haas Co.
498,524. **Antioxidants.** Wingfoot Corp.
498,575. **Rubber Colors.** Soc. of Chemical Industry in Basle.
498,679. **Extruding and Molding Composition.** Siemens & Halske A.G.

Germany

672,930. **Porous Rubber.** American Hard Rubber Co., New York, N. Y. Represented by K. Lengner and H. Kosel, both of Berlin.
673,082. **Coloring Rubber.** I. G. Farbenindustrie A.G., Frankfurt a.M.
673,083. **Sponge Rubber from Aqueous Dispersions.** Metallgesellschaft A.G., Frankfurt a.M.
673,128 and 673,129. **Rubber-like Polymerization Products.** I. G. Farbenindustrie A.G., Frankfurt a.M.
673,503. **Rubber Conversion Products.** I. G. Farbenindustrie A.G., Frankfurt a.M.

GENERAL

United States

2,149,611. **Atomizer.** F. W. Lohse, Attleboro, Mass.
2,149,663. **Bathing Cap Strap and Buckle Fastener.** F. Brighten, London, England.
2,149,757. **Steel Section.** W. S. Brink, assignor, by mesne assignments, to Firestone Tire & Rubber Co., both of Akron, O.
2,149,776. **Potato Digger Chain.** A. T. Knoerzer, assignor to Champion Corp., both of Hammond, Ind.
2,149,988 and 2,149,989. **Inkstand.** F. M. Ashley, Great Kills, assignor to L. Gompers, trustee, New York, both in N. Y.
2,150,005. **Dental Separator and Matrix Holder.** F. B. McNinch, Philadelphia, Pa.
2,150,028. **Typewriter.** W. A. Dobson, Wethersfield, Conn., assignor to Underwood Elliott Fisher Co., New York, N. Y.
2,150,057. **Sole.** A. Fisch, Heidelberg, Germany.
2,150,069. **Berry Picking Sleeve.** J. J. Koleno, Joffre, Pa.
2,150,105. **Tread Reenforcer.** I. W. Robertson, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,150,107. **Tractor Wheel.** J. W. Shields, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,150,133. **Elastic Welt.** C. W. Seidel, Chicago, Ill.
2,150,221. **Tool Joint.** F. J. Hinterliter, Tulsa, Okla.
2,150,228. **Packer.** L. F. Lamb, Dallas, Tex.
2,150,238. **Tape.** C. Mosier and J. L. Mohun, Jr., assignors to Union Asbestos & Rubber Co., all of Chicago, Ill.
2,150,260. **Comb.** E. Y. Berry, North Hollywood, Calif.
2,150,322. **Dual Wheel Spring Mounting.** V. G. and E. V. Garnett, both of Denver, Colo.
2,150,348. **Railway.** J. B. Strauss, San Francisco, Calif.; A. Strauss, J. Sparks, and H. C. Clausen, executors of said J. B. Strauss, deceased.
2,150,399. **Joint Covering and Finish.** A. C. Benedict, Rockville Center, N. Y.
2,150,420. **Inflatable Boat Motor Mounting.** J. F. Cooper, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,150,428. **Airship Mooring.** H. W. Crum and D. W. Brown, both of Akron, O., assignors to Wingfoot Corp., Wilmington, Del.
2,150,530. **Muffler.** M. L. Warsing, Altoona, Pa.
2,150,576. **Automobile Suspension.** G. W. Bell, Detroit, Mich.
2,150,602. **Machine to Clean Tumblers.** A. Griffiths, Liverpool, England.
2,150,648. **Inner Tube.** E. Eger, Grosse Pointe Park, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,150,747. **Cushion.** J. N. Naulty, East Orange, N. J.
2,150,835. **Nursing Device.** A. M. Kazimirow, Shanghai, China.
2,150,935. **Lubricator.** R. W. Miller, Winona, Minn.
2,150,956. **Tire Pressure Indicator.** J. H. Woodberry, Washington, D. C.
2,151,095. **Belt Connector.** A. L. Freedlander and N. I. Ritzert, assignors to Dayton Rubber Mfg. Co., all of Dayton, O.
2,151,096. **Packing.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,151,099. **Trolley Wire Guard.** I. G. Groendyk, assignor to Raybestos-Manhattan, Inc., both of Passaic, N. J.
2,151,186. **Tire Fabric.** F. Chadwick, assignor to Preston Tyre Fabric Mfg. Co., Ltd., both of Preston, England.
2,151,336. **Radio Signaling Apparatus.** H. Scharlau, assignor to Telefunken Gesellschaft für Drahtlose Telegraphie m. b. H., both of Berlin, Germany.
2,151,424. **Battery.** J. Galamb, Detroit, assignor to Ford Motor Co., Dearborn, both in Mich.
2,151,434. **Crib Blanket.** L. Malah, Chicago, Ill.
2,151,442. **Valve.** H. Roberts, Austin, and C. H. Robertson, Fort Worth, both in Tex.
2,151,566. **Bicycle Dynamo Nonskid Cap.** W. Sander, Swickau, Germany.
2,151,613. **Heel.** A. L. Murray, Auburn, Ind.
2,151,615. **Lawn Mower Drive Means.** E. R. Potter, assignor to Mohawk Equipment Corp., (III), both of Chicago, Ill.
2,151,654. **Storage Battery Case.** T. W. Fitzgerald, Brooklyn, assignor of one-fourth to H. Jacobson and three-eighths to L. Levy, both of New York, both in N. Y.
2,151,729. **Leg Elevator for Operating Chairs.** M. W. Baker, Youngstown, O.
2,151,824. **Pencil Eraser Tip.** J. McNulty, Bergenfield, N. J., assignor to Eagle Pencil Co., a corporation of Del.
2,151,842. **Vacuum Cleaner.** E. Faber, Stuttgart, Germany.
2,151,882. **Electric Connector.** D. Woodhead, Barrington, Ill.
2,152,131. **Tire.** B. H. Benson and B. E. Mendelsohn, both of Brookline, Mass.
2,152,159. **Tire Pressure Indicator.** E. R. and O. L. Smith, both of Sunray, and E. J. Redd, Dalhart, all in Tex.
2,152,239. **Bat.** E. W. Burnard, Rochester, N. Y.
2,152,311. **Rubber Figure.** E. Jacobson, New York, N. Y.
2,152,370. **Steering Wheel.** F. G. Woollard, assignor to Birmingham Aluminum Casting (1903) Co., Ltd., both of Smethwick, England.
2,152,373. **Valve Stem.** A. E. Bronson, Shaker Heights, and W. F. Goff, Akron, assignors to Dill Mfg. Co., Cleveland, all in O.
2,152,436. **Fountain Pen.** R. H. Koos, Gloucester, assignor to L. H. Ashmore, Collingswood, both in N. J.
2,152,476. **Tractor Attachment for Wheels.** W. E. Hardeman and R. F. Daw, both of Birmingham, England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.
2,152,580. **Journal Box Seal.** D. S. Barrows, assignor to Symington-Gould Corp., both of Rochester, N. Y.
2,152,629. **Brassiere.** W. Gluckin, New York, N. Y.
2,152,684. **Wheel.** E. A. Grange, A. F. Kaptuller, and E. J. Schmidt, assignors to Allied Engineering Co., all of Chicago, Ill.
2,152,685. **Wheel.** E. A. Grange and E. J. Schmidt, assignors to Allied Engineering Co., all of Chicago, Ill.
2,152,719. **Mat.** H. C. Williams, Milwaukee, Wis.
2,152,801. **Glass Surfacing Table.** A. L. Harrington, Roslyn Farms, assignor to Pittsburgh Plate Glass Co., Allegheny County, both in Pa.
2,152,883. **Tire.** H. Eudy, Cleveland Heights, assignor to Paine & Williams Co., Cleveland, both in O.
2,152,884. **Garment Hanger.** M. V. Gray, San Francisco, assignor of one-half to Wm. E. Schendel, Burlingame, both in Calif.
2,152,937. **Dust Guard.** A. Vigne, Webster Groves, and I. E. Cox, Kirkwood, assignors to National Bearing Metals Corp., St. Louis, all in Mo.
2,152,968. **Bathtub Cushion.** J. Monge, Staunton, Ill.

2,153,029. **Brake Valve.** F. J. Tarris, assignor to India Rubber, Gutta Percha & Telegraph Works Co., Ltd., both of London, England.
2,153,044. **Telephone Receiver Earcap.** N. P. R. Jarnak, Hillerod, Denmark.
2,153,100. **Headlight Shade.** B. Romanik, Millville, N. J.
2,153,105. **Liquid Measuring Device.** I. Szécsi, Budapest, Hungary.
2,153,244. **Elastic Tape Attaching Mechanism.** J. Galkin, New York, N. Y.
2,153,410. **Golf Balls.** B. Bogoslowsky, New York, N. Y.
2,153,420. **Package Insert for Mounting Thread.** C. A. Huttinger, Lakewood, assignor to Acme Rayon Corp., Cleveland, both in O.
2,153,529. **Sound Record in Film.** J. H. Rouse, assignor to S. A. Sollie, both of Los Angeles, Calif.
2,153,544. **Windshield Wiper.** H. B. Bell, Jr., United States Navy.
2,153,645. **Warp Goods with Rubber Threads.** J. Schönfeld, Chemnitz, Germany.
2,153,651. **Fountain Pen.** A. H. Stenersen, Chicago, Ill.
2,153,664. **Strainer.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,153,723. **Floor Covering.** R. H. Pohl, Newark, N. J., assignor to Sloane-Blabon Corp., Philadelphia, Pa.
2,153,787. **Rod Guard.** D. R. Anderson, Dallas, Tex., assignor to B. F. Goodrich Co., New York, N. Y.
2,153,832. **Insole.** T. Gutwein, Dayton, O.
2,153,836. **Slip.** J. G. Howland, Old Greenwich, Conn., assignor of one-half to H. Schwartz, New York, N. Y.
2,153,844. **Bath Brush.** E. R. Poirier, San Francisco, Calif.
2,153,896. **Curb Indicator and Bumper.** J. L. Mohar, Los Angeles, Calif.
2,153,957. **Toy.** J. Davis, W. Haven, Conn., assignor of one-half to N. L. Foster, Montclair, N. J.
2,154,047. **Traction Device.** G. E. Krider, Blair County, Pa.
2,154,077. **Joint.** F. W. Sampson, Dayton, O., assignor to General Motors Corp., Detroit, Mich.
2,154,120. **Comb.** E. S. Berliner, Westchester County, assignor to Injection Molding Corp., New York, both in N. Y.
2,154,204. **Rayon Structures.** G. P. Hoff and H. H. Parker, both of Kenmore, N. Y., assignors, by mesne assignments, to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,154,253. **Girdle.** R. W. Spain, New York, assignor of one-half to H. J. Tully, Plandome Manor, both in N. Y.
2,154,254. **Valve Stem.** S. T. Williams, Bellerose, assignor to A. Schrader's Son, Inc., Brooklyn, both in N. Y.
2,154,255. **Tire Valve.** S. T. Williams, Bellerose, N. Y., assignor to Scovill Mfg. Co., Waterbury, Conn.
2,154,290. **Tire Tread.** C. F. Snyder, Pittsburgh, Pa.
2,154,385. **Coupling.** E. F. Riesing, assignor to Firestone Tire & Rubber Co., both of Akron, O.

Dominion of Canada

379,998. **Braid.** Apex Products, Ltd., Toronto, Ont., assignee of W. Huppert, New York, N. Y., U. S. A.
380,021. **Brake Actuator.** Detroit Hydrostatic Brake Corp., assignee of C. Sauzedde, Detroit, Mich., U. S. A.
380,046. **Timber Cap.** Mineralized-Cell Wood Preserving Co., Seattle, Wash., assignee of A. L. Houghtaling, Portland, Ore., assignee of M. M. Clapshaw, now deceased, in his lifetime of Portland, Ore., both in the U. S. A.
380,130. **Tumbler Washing Machine.** A. Griffiths, Liverpool, England.
380,147. **Ski Surface.** L. E. Rapin, Paris, Seine, France.
380,150. **Inkstand.** G. J. Sengbusch, Milwaukee, Wis., U. S. A.
380,259. **Hub.** G. Steinlein, Mainberg, and L. Bruckmoser, Schweinfurt, co-inventors, both in Germany.
380,285. **Fowl Holding Device.** G. B. Markle, Jr., Hazelton, Pa., U. S. A.
380,432. **Respirator Jacket.** J. H. W. Bower, Toronto, Ont.
380,433. **Dental Massaging Device.** H. Clarren, New York, N. Y., U. S. A.
380,505. **Skiing Jacket.** J. B. Vineberg, Montreal, P. Q.

United Kingdom

494,991. **Bottle Closure and Applicator.** E. Kirmes.
495,427. **Table Game.** E. G. Morgan and C. Sheridan.
495,564. **Dolls' Eyes.** M. Wittmann.
495,640. **Hydraulic Brake System.** E. G. Carroll.
495,649. **Tire.** Henley's Tire & Rubber Co., Ltd., and H. T. Stanley.
495,659. **Fountain Pen.** T. De La Rue & Co., Ltd., and E. G. Knight.
495,663. **Condenser.** Marconi's Wireless Telegraph Co., Ltd.
495,686. **Brush Handle.** E. L. H. Cosby.
495,701. **Mop.** A Simpson, F. A. Parkinson, and L. Babbs.
495,712. **Spring Suspension.** B. I. Day and H. I. F. Evernden.
495,726. **Universal Joint.** M. F. A. Julien.
495,748. **Hydraulic Brake System.** General Motors Corp.
495,753. **Book Cover.** K. Dressel.
495,848. **Railway Signaling System.** Michelin & Cie.
495,860. **Paper-Folding Machine.** G. Spiess.
495,956. **Dock Drill.** J. T. McIntyre.
495,962. **Intake Silencer.** F. J. J. Servais.
495,982. **Brush.** W. Wessel, Jr.
496,035. **Spring Suspension.** Auto Union A. G.
496,039. **Stuffing-Box Packing.** G. Angus & Co., Ltd., (H. Freudenberg).
496,046. **Oversocks and Undersocks.** A. S. Kissack and W. R. Lloyd.
496,055. **Gear Shifting Mechanism.** Automatic Shifters, Inc.
496,067. **Aircraft Alighting Gear.** J. H. Robertson.
496,074. **Toe Pads.** J. A. Toner.
496,091. **Joint.** Hardy, Spicer & Co., Ltd., and F. Middleton.
496,118. **Sound and Picture Apparatus.** Office General De La Cinematographie Française.
496,155. **Flow Heater.** R. Dight.
496,164. **Projectile Fuze.** G. Perrenoud.
496,170. **Coating Machine.** H. Lowe.
496,173. **Sheet Feeding Device.** G. Spiess.
496,183. **Aircraft Wheel.** H. Mahle.
496,185. **Railway Bogie.** Getefo Ges. Fur Technischen Fortschritt.
496,197. **Overshoe.** P. Stelzmann Wirkwarenfabriken A. G.
496,219. **Cycle Spring Forks.** C. Macbeth.
496,222. **Resilient Mounting.** M. Goldschmidt.
496,249. **Bottle Capper.** J. R. Gammeter.
496,279. **Tire.** Elektronmetall Ges.
496,282. **Mounting Bearing.** Roulements A Billes Miniatures Soc. Anon.
496,296. **Valve.** Whitehead Torpedo Co., Ltd., and L. Jones.
496,324. **Massage Apparatus.** L. Fisher.
496,359. **Tire.** Firestone Tire & Rubber Co., Ltd.
496,387. **Resilient Mounting.** M. F. A. Julien.
496,393. **Gear.** C.A.V.-Bosch, Ltd., and W. H. Glaser.
496,397. **Liquid-Releasing Means for Cow-Milkers, Etc.** H. G. Williams and T. E. Love.
496,401. **Engine Mounting.** L. Thiry.
496,435. **Vehicle Spring-Suspension.** Briggs Mfg. Co.
496,451. **Corset.** G. Rayner.
496,452. **Stopper.** United States Rubber Products, Inc.
496,454. **Percussive Drill Silencer.** A. W. C. Mandel.
496,472. **Sliding-Clasp Fastener Machine.** United States Rubber Products, Inc.
496,489. **Towel Rail.** L. Mellersh-Jackson, (Flax Kommandit-Ges.).
496,496. **Potato Harvester.** T. J. Caudwell.
496,498. **Wringer.** F. Backhouse, (M. Koster).
496,584. **Spray.** R. Gardner.
496,596. **Skirt.** J. E. W., J. K. A. and H. P. R. Herpich, (trading as C. A. Herpich Sohne).
496,601. **Hydrometer.** A. L. Morton.
496,605. **Condenser.** P. A. Sporing and Telegraph Condenser Co.
496,640. **Tube.** F. A. Stark and Lunken Co., Ltd.
496,642. **Aircraft Frame Stiffener.** O. Oeckl.
496,646. **Draught Appliances for Railways.** Waugh Equipment Co.
496,736. **Sole Buffing Roll.** British United Shoe Machinery Co., Ltd., R. Gorbold, and A. R. O'Key.
496,767. **Cow Milker.** B. V. Orre.
496,770. **Footwear Counter Stiffeners.** A. F. Burgess. (Paper Patents Co.)
496,793. **Pipe Cleaner.** B. Kaplan.
496,841. **Coupling.** E. L. W. Byrne, (Titeflex Metal Hose Co.).
496,863. **Oil Lamp.** P. F. P. Berryman, (C. G. P. Berryman).
496,871. **Package Wrapping.** Marathon Paper Mills Co. and A. F. Burgess.
496,877. **Shelves for Bottles, Boxes, Etc.** W. Walsh.
496,884. **Piston.** N. B. Newton.
496,885. **Light Projector.** Research Corp.
496,896. **Joint.** W. W. Hamill.
496,932. **Wheel Tire.** A. F. Roth.
496,949. **Diaphragm.** G. D. Mills.
496,975. **Hose.** S. Bailey and Sussex Rubber Co., Ltd.
496,980. **Vehicle Spring-Suspension.** A. Dubonnet.
496,986. **Resilient Mounting.** Getefo Ges. Fur Technischen Fortschritt.
496,990. **Plate Rack.** E. J. Bowman.
497,008. **Spring Fork.** E. Turner.
497,014. **Brackets.** Thermos (1925), Ltd., and L. T. Sawney.
497,051. **Spring.** E. Turner.
497,098. **Window Frame.** North British Rubber Co., Ltd., and A. Johnston.
497,104. **Vehicle Bodies.** Auto Union A.G.

497,110. **Pipe Joint.** J. S. Towers and J. A. Jeffs.
497,113. **Anaesthetic Apparatus.** Ohio Chemical & Mfg. Co.
497,123. **Reflecting Signal.** K. Schlapfer.
497,127. **Coupling.** British Thomson-Houston Co., Ltd.
497,128. **Necktie Holder.** W. Brandtner.
497,172. **Feeding-Bottle Holder.** P. E. Allen.
497,220 and 497,221. **Airscrew Spinner.** De Havilland Aircraft Co., Ltd., and F. M. Thomas.
497,237. **Cigarette Making Machine.** American Machine & Foundry Co.
497,239. **Apparatus to Treat Threads with Liquid.** Courtaulds, Ltd., and W. H. Stokes.
497,261. **Manure Distributer Hopper.** J. H. Nitschke.
497,287. **Centrifugal Pump.** Allen Sherman Hoff Co.
497,348. **Coated Paper.** S. D. Warren Co.
497,372. **Coupling.** R. Bosch A. G.
497,391. **Cable.** Siemens-Schuckertwerke A.G.
497,393. **Draught Excluder.** B. F. Goodrich Co.
497,415. **Tire Inflator.** L. B. Beath.
497,456. **Driving Belt.** A. L. Freedlander.
497,464. **Reservoir Pad.** H. R. Macmichael.
497,466. **Aerial.** M. Sharp.
497,475. **Hair Waving Apparatus.** B. Gottfried.
497,476. **Pump.** C. W. Stancliffe and Winget, Ltd.
497,484. **Sterilizer.** E. A. Rowsell.
497,493. **Valve.** W. C. Holmes & Co., Ltd., H. Bentley, and D. M. Henshaw.
497,497. **Engine Mounting.** C. C. Pounder, A. Blair, and F. E. Rebbeck.
497,505. **Joint.** Hardy, Spicer & Co., Ltd., and J. A. Daniell.
497,524. **Massage and Suction Apparatus.** M. Zolotnitzky.
497,530. **Atomizer.** J. Karbe.
497,549. **Plastic Material Extruder.** Bird Machine Co.
497,577. **Hydraulic Accumulator.** W. H. Bramble and Ruston & Hornsby, Ltd.
497,584. **Gyroscopic Appartus.** Sperry Gyroscope Co., Ltd., W. G. Harding, and R. W. Nisbet.
497,591. **Corset.** S. D. Ryall.
497,604. **Pencil.** H. M. Fecher.
497,624. **Joint.** L. Thiry.
497,682. **Lath Fabric Blinds and Shutters.** E. Bugatti.
497,707. **Bearing Mount.** Sperry Gyroscope Co., Ltd., W. G. Harding, and R. H. Nisbet.
497,710. **Gas Protective Clothing.** R. H. Davis, G. P. Crowden, and N. G. Elliot.
497,730. **Cushion.** United States Rubber Products, Inc.
497,754. **Hygrometric Apparatus.** Bendix Aviation Corp.
497,785. **Can Closure.** P. Bogner.
497,790. **Resilient Support.** M. Goldschmidt.
497,807. **Filter.** A. E. O'Dell. (Bird Machine Co.)
497,817. **Exerciser.** A. Richard.
497,843. **Valve.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., F. J. Tarris, and D. Webb.
497,868. **Vehicle Suspension.** J. W. Morgan and H. Paykel.
497,903. **Joint.** Hardy, Spicer & Co., Ltd., and F. A. Middleton.
497,904. **Sliding Door.** Getefo Ges. Fur Technischen Fortschritt.
497,907. **Window.** E. G. Budd Mfg. Co.
497,920. **Windscreen Wiper.** J. J. Speiser.
497,934. **Pad for Reshaping Deformed Sheet-Metal Parts.** Blackhawk Mfg. Co.
497,944. **Buffing Roll.** British United Shoe Machinery Co., Ltd., W. Barton, R. Gorbold, and A. R. O'Key.
497,946. **Arm Rest.** C. W. Ambrose, G. J. Bull, and Len, Ltd.
498,061. **Tobacco Pouch.** S. F. Boves.
498,068. **Irradiating and Bottling Milk Apparatus.** H. F. Glunz.
498,077. **Glazing Windows.** Short Bros. (Rochester & Bedford), Ltd., S. G. Hart, and B. Wilkinson.
498,158. **Horseshoe.** F. J. Marsh.
498,224. **Joint.** P. C. A. M. D'Aubarede.
498,254. **Handle Grip.** P. Stanford.
498,273. **Motor Horn Casing.** V. Seklehner, and P. Wessely.
498,278. **Foot Inspection and Recording Device.** D. Weisberger.
498,357. **Gage.** P. Kollsman.
498,423. **Brush.** H. Clarren.
498,447. **Current-Collector.** Firestone Tire & Rubber Co., Ltd.
498,489. **Sparking Plug.** A. A. Rubbra.
498,527. **Buckle.** Scholl Mfg. Co., Ltd., and G. Thornton-Norris.
498,589. **Conveyer.** Aktiebolaget A. Ekstroms Maskinaffar and N. W. Jonsson.
498,591. **Coated Fabric.** L. T. Sawyer.
498,624. **Slat and Lath Fabric.** W. H. Scheidt.
498,661. **Vacuum Flask.** R. Frischer and F. Schmidt.
498,805. **Lamp Anti-Dazzle Device.** C. B. Dann and Conrays, Ltd.
498,822. **Container.** A. Neumann.
498,845. **Sink Attachment.** L. O. Saunders and C. Davies.
498,908. **Piston Packing.** Elektronmetall Ges.
498,928. **Heater.** A. McDonald and H. Webb & Co. (Engineers), Ltd.
498,953. **Blowpipe Burner.** Dill Mfg. Co. and C. F. Carroll.

Germany

672,254. **Tube.** R. Kirchhoff, Baden-Baden.
672,805. **Atomizer.** V. Mendl, Prague. Represented by H. Ruschke and K. Grentzenberg, both of Berlin.
673,110. **Tire Cover.** Deutsche Dunlop Gummi-Co. A.G., Hanau a.M.

TRADE MARKS

United States

365,485. **"Polly Tucker."** Brassieres, corsets, etc. Bonwit Teller, Inc., New York, N. Y.
365,490. **Riteset.** Combs. American Hard Rubber Co., Hempstead, N. Y.
365,517. **Fashion Form.** Corsets, brassieres, etc. Aurora Corset Co., Aurora, Ill.
365,518. **Kool-Wear.** Brassieres and girdles. Blossom Products Corp., Allentown, Pa.
365,564. **Dorothea Sandrae.** Girdles, brassieres, garter belts, etc. D. S. Hay, New York, N. Y.
365,579. Representation of a crown and shield containing the word: **"Nobility."** Suspenders and garters. B. D. Mosesson, New York, N. Y.
365,602. **Plio Tye.** Cords for tying packages. Freydberg Bros., Inc., Stamford, Conn.
365,756. Representation of an endless belt and the words: **"Lapless Endless."** Belting. Ton-Tex Corp., Grand Rapids, Mich.
365,766. **Manhattan.** Combs. American Hard Rubber Co., Hempstead, N. Y.
365,789. Oval containing the words: **"Nu-Dent"** and below the words: **"Unit-Bilt."** Dental rubber-work. Nu-Dent Porcelain Studio, Inc., New York, N. Y.
365,801. **Dennis - Tru - Blu.** Squeegee. W. J. Dennis & Co., Chicago, Illinois.
365,873. **Vultramine.** Accelerators. General Dyestuff Corp., New York, N. Y.
365,875. Representation of a double triangle containing the letters **"C S Co"** within a circle. Hose. Continental Supply Co., Dallas, Tex.
365,896. **Lightning Speed.** Belting. Hewitt Rubber Corp., Buffalo, N. Y.
365,909. Ruled drawing with the lines in yellow and black. Fan belts, radiator hose, and generator couplings made partly of rubber. American Brake Shoe & Foundry Co., doing business as American Brakeblok Division of The American Brake Shoe & Foundry Co., New York, N. Y.
365,954. **Step Down.** Fishing rod handle grips. American Fork and Hoe Co., Cleveland, O.
365,963. **Hit-It.** Play sets including ball and bat. Sponge Rubber Products Co., Derby, Conn.
365,966. **Rx.** Tires. Pennsylvania Rubber Co., Jeannette, Pa.
366,015. **Target.** Tank balls. United States Rubber Products, Inc., assignor to United States Rubber Co., both of New York, N. Y.
366,028. Representation of a bear with fore paws on a ball containing the words: **"*Black Bear Company Inc* Long Island City N.Y."** Lubricants. Black Bear Co., Inc., Long Island City, N. Y.
366,062. **Puck-O-Nit.** Knitted elastic piece goods. Superior Silk Mills, Inc., Gloversville, N. Y.
366,063. **All Star.** Balls for sports. McMillan Athletic Goods Co., Inc., Terre Haute, Ind.
366,099. **Novasheen.** Knitted elastic piece goods. Superior Silk Mills, Inc., Gloversville, N. Y.
366,135. **Joan Eddy.** Brassieres and girdles. Lerner's Vogue Shops, Kansas City, Mo.
366,257. **Writing Master.** Fountain pens. Waterbury Clock Co., Waterbury, Conn.
366,265. Representation of a panel, an Indian's head, and the words: **"The Chief."** Prophylactic articles. L. Schweitzer, Baltimore, Md.
366,314. **Dure z Wood.** Plywood and rubber bonded or cemented with a resinous bond. General Plastics, Inc., North Tonawanda, N. Y.
366,508. Representation of a seal containing the words: **"Seal Fast"** and the word: **"Bowes"** above. Tire and tube repair outfits or kits, dough kits, rubber valve stems, and fan belts and radiator hose. Bowes "Seal Fast" Corp., Indianapolis, Ind.

Editor's Book Table

NEW PUBLICATIONS

"Day Ro-Ball Stabilized Gyrating Screens." The J. H. Day Co., Cincinnati, O. 12 pages. This Bulletin No. 375 describes the construction features of Ro-Ball screens and illustrates a number of designs for the precision separation of many different kinds of materials. Equipment for both wet and dry separation is discussed. Listed applications include many of the materials commonly used in rubber compounding.

"Charles Goodyear." Hugh Allen. The Goodyear Tire & Rubber Co., Akron, O. 15 pages. Sub-titled "An Intimate Biographical Sketch," this little booklet is just that. Issued in connection with current celebration of the one hundredth anniversary of Goodyear's discovery of vulcanization, it retells the now familiar story of the inventor's life, his early efforts with rubber leading to the accidental discovery of vulcanization, his later years, and final death. Goodyear's love for research and distaste for producing goods, his imagination and indomitable will to forge ahead are portrayed throughout this brief résumé of the outstanding events in his life. Copies may be obtained free of charge by addressing the company.

"Index to A. S. T. M. Standards and Tentative Standards." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. 140 pages. This latest edition of the index gives information on all of the 870 standards as of January 1, 1939. All items are listed under appropriate key-words according to the materials or subjects to which they apply. As an added convenience, a list is given of the specifications and tests in numeric sequence of their serial designation. Reference is made to 28 rubber products on page 80 of the index. Copies of this index will be furnished without charge on written request to A. S. T. M. headquarters.

"Survey of the Tire and Rubber Industry." Poor's Publishing Co., 90 Broad St., Wellesley, Mass. 20 pages. This is a general survey of all factors and conditions affecting the present position and future outlook of the industry. According to this survey, the current year should be a good one. Extensive data and statistics covering prices, production, and consumption are included. In addition twelve individual companies are selected for analysis of earnings, financial position, and opportunities for future expansion.

"The Vanderbilt News." March-April, 1939, R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 28 pages. This issue of the *News* deals with the compounding properties of 14 rubber materials with particular reference to their use with Captax. Formulas, physical test data, and brief summaries of significant results are included.

"Modern Plastic Material Testing Machines." Bulletin No. 17. Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. 12 pages. The firm's testing machines which are adaptable to the testing of plastic materials are briefly presented in this bulletin. The equipment described includes: the Universal testing machine for tension, compression, and flexure tests; stiffness tester (Tour-Marshall design); impact testing machine; a machine for measuring distortion under heat; and the Bakelite flow testing machine.

"The First Report of the Rubber Foundation 1936/37." Rubber Stichting, Heerengracht 182, Amsterdam, Holland. 124 pages. This report covers the period from October 31, 1936, when the foundation was established, to December 31, 1937, and gives information regarding the formation of this organization, the board, delegates, committees, etc., and the various activities of the foundation. The organization publishes its own journal, *Rubber*, which for the time being appears every two months. In addition "Communications" are periodically issued and distributed on a large scale not only in the Netherlands and Netherland India, but also in foreign countries, usually in French, German, and English, besides Dutch.

The 1937 program of the research department included problems connected with the combination of rubber powder with asphalt; latex and colloidal clay mixtures; investigation into the properties of latex and latex compounds; improvement of resistance to oil and heat; use of rubber for damping vibrations; uniting rubber to metal and concrete, etc. The work scheduled for 1938 covered, besides continued efforts to improve bitumen properties by the addition of rubber powder, the preparation and manufacture of rubber powder; the search for efficient methods of uniting rubber to other materials; investigation of the synthesis of rubber and the properties of synthetic rubber with a view to discovering possible pointers which might prove helpful in improving the qualities of plantation rubber.

"Aerosol OT in Pigment Slurries." American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y. 12 pages. The effect of adding the wetting agent Aerosol OT to water suspensions of pigments used to prevent rubber slabs from sticking together is briefly discussed in this illustrated booklet. Advantages for this purpose are claimed to be a reduced tendency for the pigment to settle and an increased uniformity of pigment deposit on the rubber slab.

"Accelerateur Rapide 3 RN." S.A. des Matieres Colorantes et Produits Chimique de Saint-Denis, 69 Rue de Meromesnil, Paris (8e), France. 16 pages. The new rapid accelerator 3 RN described in this booklet is a yellowish-white powder, practically insoluble in water, soluble in alcohol and acetone, and very soluble in benzene and chloroform. It is recommended for use in making dipped goods either from rubber solution or latex, for rubberizing fabrics, for white and bright colored mixes. As it leaves neither taste nor odor, it can be used for making jar rings, washers for bottles, sanitary goods, etc. Being soluble in rubber, it is also suitable for transparent goods.

"1938 A.S.T.M. Proceedings." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. 2080 pages. The proceedings are published in two parts: Part I comprises committee reports and new and revised tentative standards; Part II contains 45 technical papers, including the Marburg lecture on "The Torsion Test." Parts I and II can be purchased at $5.50 each in stiff paper cover; $6, cloth; and $7, half-leather, from A.S.T.M. headquarters.

"List of Inspected Fire Protection Equipment and Materials, January, 1939." Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. This pamphlet comprises a list of inspected gas, oil, and miscellaneous appliances, a combined list of appliances inspected for accident hazard, inspected automotive and burglary protection appliances, and a list of inspected electrical appliances.

"Petroleum Products for Rubber—Lubetext Section," Standard Oil Company of New Jersey. This eight-page circular discusses generally the company's products for use in the rubber industry, including softeners, mold lubricants, solvents, and petroleums for reclaiming purposes.

BOOK REVIEWS

"Colloidal Phenomena." Ernst A. Hauser. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. 1939. Cloth, 6 by 9 inches, 294 pages. Subject and name indexes. Appendix. Price $3.

The book opens with a brief review of historical developments, followed by a clear concise explanation of the colloidal state of matter, which stresses the importance of considering colloids in the light of their dimensional qualities. The relation between particle size or degree of dispersion and the properties of matter is pointed out, showing how certain properties become measurably altered in the colloidal range. Subsequent chapters logically develop the science through the production of colloidal systems, kinetics of colloidal particles, electrical properties of such systems, and surface phenomena. Other topics clarified in this treatment are: protection and sensitization, peptization, coagulation and dissolution, influence of particle shape, optics of colloids, and colloidal aggregates.

Complicated mathematical formulas and derivatives have been omitted from the regular text, but have been summarized in the appendix. In addition the appendix contains a clear exposition of the theory of X-ray diffraction and sections on microscopy and infrared spectroscopy. Containing the latest views on the study of colloids, this book will prove of value to those engaged in the research or development of the many different materials which fall within the scope of this science.

"The Chemical Formulary." Volume IV. Edited by H. Bennett. Published by Chemical Publishing Co. of New York, Inc., 148 Lafayette St., New York, N. Y. 1939. Cloth, 5½ by 8½ inches, 638 pages. Index. Price $6.

This fourth volume follows the arrangement of previous volumes and contains new and additional formulas gathered from many sources during the past year. An innovation in this edition is an introductory chapter for beginners which contains directions for making simple preparations in everyday use. In a 29-page chapter on "Rubber, Resins, Plastics, Waxes" basic information and some formulas, largely from patents, treat rubber manufacturing in a broad way.

"The Knack of Selling Yourself." James T. Mangan. The Dartnell Corp., Chicago, Ill. Cloth, 5½ by 8½ inches, 234 pages. Price $2.50.

It is the author's contention that the world rewards us not according to how capable we are, but how well we sell ourselves. Those who get the big salaries and the lion's share of everything are not those who know the most, but

(*Continued on page 74*)

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Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Feb. 25	Mar. 25	Apr. 1	Apr. 8	Apr. 15	Apr. 22
Mar.	16.50	16.01	.....	.....	.....	.....
Apr.	16.53	16.01	15.92	16.10	15.75	15.72
May	.....	.....	15.90	16.10	15.75	15.72
July	16.56	16.04	15.88	16.10	15.76	15.83
Sept. ...	16.57	16.05	15.90	16.10	15.76	15.84
Dec.	16.58	16.05	15.88	16.10	15.76	15.87
Feb.	.....	16.50	15.89	16.12	15.77	15.91
Mar.	.....	.....	15.89	16.12	15.77	15.95
Volume per week (tons)	12,440	8,600	6,240	4,860	12,200	8,540

THE Commodity Exchange table published here shows prices of representative future contracts of the New York market for the last two months.

After strengthening during the first week of April to reflect the firmness of the rubber markets in London and Singapore, the rubber futures market here weakened somewhat under the influence of the uncertain European political situation. Announcement of the proposed barter plan involving an exchange of surplus cotton for crude rubber emergency supplies had little or no effect on the market. Factories were fairly heavy buyers last month and exchanged futures for actual rubber in liberal amounts. Trading, however, was generally light. There was little spread between the prices of nearby and distant months during April.

The price of September futures closed at 15.90¢ per pound on April 1, moved up to 16.10¢ on April 6, and then was easier, closing at the low level of 15.67¢ per pound on April 17. The closing price rose to 15.95¢ per pound on April 19 under the influence of foreign buying. On April 26 the closing price was 15.89¢ per pound.

Crude rubber consumption in the United States during March totaled 50,165 long tons, the highest since June, 1937, and somewhat better than generally expected. Consumption for the first quarter of 1939, totaling 138,764 tons, was 66% higher than the figure for the first quarter of 1938 and is exceeded only by the consumption during the first three months of 1937 which totaled 156,958 tons, the all-time record.

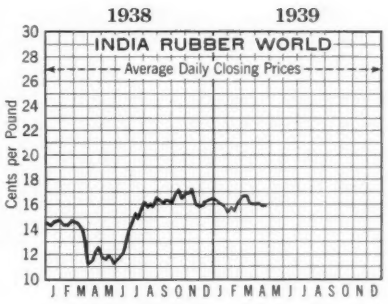
Net exports from restriction scheme countries in February were 2,396 tons under the permissible amount. Deducting this from overshipments for January leaves an excess of 14,897 tons. Ceylon, a relatively small producer, has the greatest excess, 5,208 tons.

New York Quotations

New York outside market rubber quotations in cents per pound

	Apr. 27, 1938	Mar. 27, 1939	Apr. 25, 1939
Plantations			
Rubber latex...*gal.*	46/47	59/60	59/60
Paras			
Upriver fine.....	11¼	13½	13½
Upriver fine.....	15¾	*16½	*16½
Upriver coarse ...	8	9½	9¾
Upriver coarse ...	*13	*14½	*14¾
Islands fine	10½	13¼	13¼
Islands fine	*14½	*15½	*15¾
Acre, Bolivian fine	11½	13¾	13¾
Acre, Bolivian fine	*15½	*16½	*16¾
Beni, Bolivian fine	12	14½	14¼
Madeira fine.....	11¼	13½	13½
Caucho			
Upper ball.....	8	9½	9¾
Upper ball.....	*13	*14½	*14¾
Lower ball.....	7½	9¼	9½
Pontianak			
Pressed block	12/28	9/13½	8¾/15
Guayule			
Duro, washed and dried	11½	13	13
Ampar	12	13¼	13¼
Africans			
Rio Nufiez.....	13¾	14	14
Black Kassai.....	13¾	14	14
Prime Niger flake.	23	25	25
Gutta Percha			
Gutta Siak.....	13	10	9
Gutta Soh	17	14½	15
Red Macassar	1.00/1.25	80/1.20	85/1.20
Balata			
Block, Ciudad Bolivar	30	29	..
Manaos block	27	29	30
Surinam sheets...	38	40	41
Amber	39	42	43

*Washed and dried crepe. Shipments from Brazil.



New York Outside Market—Spot Ribbed Smoked Sheets

New York Outside Market

The outside market after a quiet first week became somewhat more active as the month progressed, with a fair amount of factory business reported. Shipment offerings from the Far East were limited in quantity. The uncertainty in conditions abroad brought out a heavier interest in spot rubber; consequently disturbing news did not depress the spot market to the extent that the futures market was affected. A better demand for standard thin latex crepe has been reflected in a relatively higher price for that grade.

The price of No. 1 ribbed smoked sheets, which closed at 15 13/16¢ per pound on April 1, held generally steady during the month, closing at 16 1/16¢ per pound on April 19. The closing price on April 26 was 16 1/16¢ per pound.

The week-end closing prices on No. 1 ribbed smoked sheets follow: April 1, 15 13/16¢; April 8, 16 1/8¢; April 15, 15 7/8¢; and April 22, 16¢.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
April 1.....	46,770	25,039
April 8.....	45,730	24,788
April 15.....	45,807	24,527
April 22.....	45,401	23,865

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	March, 1939					April, 1939																
	27	28	29	30	31	1	3	4	5	6	7*	8*	10	11	12	13	14	15	17	18	19	20	21	22
No. 1 Ribbed Smoked Sheet	16 1/4	16 1/16	16 1/16	15 13/16	15 7/8	15 13/16	16 1/16	16	16 1/16	16 1/16	..	..	16 1/16	15 7/8	15 13/16	15 7/8	15 3/4	15 7/8	15 3/4	15 7/8	16 1/16	16	16	16
No. 1 Thin Latex Crepe...	17 1/4	17 1/16	17 1/16	17 1/16	17	17 1/16	17 1/16	17 1/16	17 1/16	17 3/16	..	..	17 3/16	17 1/16	17 1/16	17 1/4	17	17 1/16	17	17 3/16	17 3/16	17 3/16	17 3/16	17 3/16
No. 2 Thick Latex Crepe..	18 1/2	18 1/16	18 1/16	18 1/16	18 1/4	18 1/16	18 1/16	18 3/16	18 1/16	18 3/16	..	..	18 1/2	18 1/4	18 1/16	18 3/16	18 1/16	18 1/4	18 1/16	18 1/2	18 5/16	18 5/16	18 5/16	18 5/16
No. 1 Brown Crepe	15 3/4	15 1/16	15 1/16	15 1/16	15 1/2	15 1/16	15 1/16	15 5/16	15 1/16	15 3/4	..	..	15 3/4	15 1/2	15 1/16	15 5/16	15 1/2	15 3/16	15 1/2	15 5/16	15 1/16	15 5/16	15 5/16	15 5/16
No. 2 Brown Crepe.....	15 5/16	15 1/16	15 1/16	15 1/16	15 3/16	15 1/16	15 1/16	15 1/2	15 1/16	15 3/16	..	..	15 5/16	15 3/16	15 1/16	15 5/16	15 1/2	15 3/16	15 1/2	15 5/16	15 1/16	15 1/4	15 1/4	15 1/4
No. 2 Amber	15 3/4	15 1/16	15 1/16	15 1/16	15 1/2	15 1/16	15 1/16	15 5/16	15 1/16	15 3/4	..	..	15 3/4	15 1/2	15 1/16	15 5/16	15 1/2	15 3/16	15 1/2	15 5/16	15 1/16	15 1/4	15 1/4	15 1/4
No. 3 Amber	15 5/16	15 1/16	15 1/16	15 1/16	15 3/16	15 1/16	15 1/16	15 1/2	15 1/16	15 3/16	..	..	15 5/16	15 3/16	15 1/16	15 1/2	15 3/16	15 1/2	15 3/16	15 1/2	15 1/16	15 5/16	15 5/16	15 5/16
Rolled Brown	14 3/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/4	14 1/16	14 3/16	..	..	14 3/16	14 1/16	14 1/16	14 3/16	14 1/4	14 3/16	14 1/4	14 3/16	14 1/16	14 1/2	14 1/2	14 1/2

*Closed.

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1937	185,033	162,000	29.8	28,800	13,233
1938	113,482	113,341	27.6	21,769	7,407
1939					
Jan.	13,763	13,000	28.1	21,960	748
Feb.	13,093	12,626	30.9	21,390	630
Mar.	14,528	15,322	30.5	19,955	....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

THE R. M. A. estimates March reclaimed rubber consumption at 15,322 long tons, 17.6% above that of February; production at 14,528 long tons; and stocks on hand March 31, 19,955 long tons. In terms of the March consumption figure, stocks represent only 1.3 months' supply. Demands originating from mechanical goods as well as soles and heels are holding up well; while demand from the tire industry is showing evidence of slackening slightly. Insulated wire manufacturers have curtailed orders considerably.

The market continues steady, and all grades of reclaim remain unchanged at previously quoted levels.

New York Quotations

April 21, 1939

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
No. 1 Floating	1.00	12 /12¼
Compound	1.10-1.20	8 / 8¼
Red Tube	1.15-1.30	8 / 8¼
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	11½/12

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber

Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption¶ Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.—Public Warehouses, London Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1936	490,858	575,000	223,000	56,567	78,462	26,969	855,700	1,044,695	538,028
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,136,100	1,103,591	639,025
1938	400.178	411,363	245,413	45,105	86,853	27,084	890,723	917,378	587,950
1938									
Jan.	42,135	29,429	274,581	57,356	62,108	48,494	80,422	68,697	a634,330
Feb.	43,930	23,868	294,338	47,459	71,516	46,241	81,049	63,152	a653,791
Mar.	35,967	30,487	299,172	41,882	76,617	50,797	81,264	78,259	a670,332
Apr.	30,807	27,984	301,436	39,071	82,754	40,614	86,763	70,284	a668,440
May	27,410	28,947	299,720	32,859	87,215	40,598	64,461	76,980	a653,865
June	26,011	30,629	294,566	32,079	92,312	44,729	70,965	70,761	a670,068
July	22,918	32,209	284,914	40,400	95,252	45,529	79,780	72,089	a670,873
Aug.	31,099	38,170	277,463	47,772	99,614	41,002	74,653	73,465	a654,704
Sept.	37,374	37,823	276,586	48,927	98,140	35,386	70,984	77,838	a646,378
Oct.	34,496	40,333	269,937	51,062	93,779	34,001	75,612	85,911	a634,580
Nov.	31,054	46,169	254,196	51,114	90,073	31,255	67,048	91,796	a604,271
Dec.	36,977	45,315	245,413	45,105	86,853	27,084	57,722	88,146	a587,950
1939									
Jan.	39,082	46,234	237,826	48,210	80,643	30,975	87,114	88,921	a597,660
Feb.	36,490	42,365	231,475	55,814	75,517	28,559	76,875	84,345	.....
Mar.	38,989	50,165	219,843	55,981	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. a Japan stocks not included.

CRUDE rubber consumption by United States manufacturers during March is estimated at 50,165 long tons, against 42,365 long tons during February, a gain of 18.4% over February and 64.5% over the 30,487 long tons consumed in March, 1938, according to R.M.A. statistics.

Gross imports of crude rubber for March are reported to be 38,989 long tons, an increase of 6.8% above the February figure of 36,490 long tons and 8.4% above the 35,967 long tons imported in March, 1938.

Total domestic stocks of crude rubber, on hand March 31 are estimated at 219,843 long tons, compared with February 28 stocks of 231,475 long tons and 299,172 long tons March 1, 1938.

Crude rubber afloat to U. S. ports as of March 31 is estimated at 55,981 long tons, against 55,814 long tons afloat on February 28 and 41,882 long tons afloat on March 31, 1938.

RUBBER SCRAP

FOLLOWING an active first quarter, scrap rubber business became somewhat slower last month. During the past few years world trade in scrap rubber has increased appreciably, with European and Far Eastern countries importing considerable amounts. Recent reports indicate that Japan has become the largest importer of scrap rubber, using it chiefly in the production of reclaim. It is expected that when conditions become adjusted in Spain, that country will import considerable quantities of scrap for direct use for footwear. Increased demand for scrap abroad, if the present trend continues, may reflect in a firmer market here.

The market is steady with all grades holding unchanged at last month's levels.

CONSUMERS' BUYING PRICES

(Carload Lots for April 21, 1939)

		Prices
Boots and Shoes		
Boots and shoes, black	*lb.*	$0.01 /$0.01½
Colored	*lb.*	.00¾/ .00⅞
Untrimmed arctics	*lb.*	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	*lb.*	.08½/ .09
No. 2, compound	*lb.*	.03⅜/ .03¾
Red	*lb.*	.03½/ .03¾
Mixed tubes	*lb.*	.03½/ .03¾
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	11.50 /12.00
Beadless	*ton*	15.00 /16.00
Auto tire carcass	*ton*	18.50 /19.50
Black auto peelings	*ton*	18.00 /19.00
Solid		
Clean mixed truck	*ton*	26.00 /27.00
Light gravity	*ton*	31.00 /33.00
Mechanicals		
Mixed black scrap	*ton*	15.00 /17.50
Hose, air brake	*ton*	20.00 /22.50
Garden, rubber covered	*ton*	10.00 /12.50
Steam and water, soft	*ton*	10.00 /12.50
No. 1 red	*lb.*	.02¾/ .03
No. 2 red	*lb.*	.02¼/ .02½
White druggists' sundries	*lb.*	.03¾/ .04
Mixed mechanicals	*lb.*	.02¼/ .02½
White mechanicals	*lb.*	.03⅝/ .03¾
Hard Rubber		
No. 1 hard rubber	*lb.*	.11 / .11½

Galex—Stabilized Rosin

A SUBSTANTIALLY stable rosin, known as Galex, is said to be suited for use in adhesives, particularly where latex is employed. It is claimed that adhesives made with Galex retain their tackiness much longer than those containing ordinary rosin.

In the production of Galex the abietic type of rosin acids present in ordinary rosin is subjected to a dehydrogenation and simultaneous hydrogenation with the result that a mixture is obtained which comprises dehydro, dihydro, and tetrahydro abietic acid. The new rosin is light amber in color, has an acid number of 156 to 157, and melts at 62° C. It is soluble in most organic solvents and is highly stable to oxidation and atmospheric conditions.

COMPOUNDING INGREDIENTS

THE demand for compounding ingredients in general slackened slightly during the past month from the higher level of activity evident throughout the first quarter. Barring any disturbing developments, activity should continue at a fair rate. Prices in general continue steady and unchanged.

CARBON BLACK. Movement of black into consumption during April continued good although some slackening occurred toward the end of the month. One company reported shipments during the six-month period ending February were heavier than for any previous six months. Previous low prices continued to prevail.

FACTICE OR RUBBER SUBSTITUTES. An amendment to be attached to the Nuisance Tax bill calling for a 5¢ per pound processing tax on rapeseed oil is expected to be presented before the Senate early in May. This has had a disturbing effect on the market for rubber substitutes. Demand continues fair, with prices holding steady.

LITHARGE. Commercial powdered litharge was reduced ten points for car lots to a level of 6½¢ per pound in the South and West and 6¼¢ in other sections. Demand continued active.

LITHOPONE. Contract prices for the second quarter are to be held at the first-quarter level. Volume of sales continues good.

RUBBER CHEMICALS. The demand for these chemicals showed a slight let up during April. Prices continue substantially unchanged.

RUBBER SOLVENTS. Demand has been fair with modest amounts purchased by Akron tire makers. Prices hold steady.

STEARIC ACID. Market activity was moderate, and prices continue at last month's levels.

TITANIUM PIGMENTS. The demand from all consuming sources, including the rubber industry, exceptionally good for the first quarter of 1939, continued brisk during April. Prices remain unchanged.

ZINC OXIDE. Sales held up well the past month. Prices which continue at previously quoted levels are not expected to change for some time.

New York Quotations

April 21, 1939

Prices Not Reported Will Be Supplied on Application

Abrasives		
Pumicestone, powdered	lb.	$0.03 /$0.035
Rottenstone, domestic	lb.	.03 / .035
Silica, 15	ton	38.00
Accelerators, Inorganic		
Lime, hydrated, l.c.l., New York	ton	20.00
Litharge (commercial)	lb.	.0675/ .0725
Accelerators, Organic		
A-1	lb.	.24
A-10	lb.	.35 / .40
A-11	lb.	.52 / .65
A-19	lb.	.52 / .65
A-32	lb.	.70 / .80
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 49	lb.	.42
737	lb.	.42 / .43
737-50	lb.	.25 / .26
808	lb.	.70 / .72
833	lb.	1.15
Acrin	lb.	.60
Aldehyde ammonia	lb.	.70
Altax	lb.	.55 / .70
B-J-F	lb.	.50 / .55
Beutene	lb.	.70 / .75
Butyl Zimate	lb.	2.65
C-P-B	lb.	2.00
Captax	lb.	.50 / .60
Crylene	lb.	.40 / .47
Paste	lb.	.30 / .36
D-B-A	lb.	2.00
Di-Esterex	lb.	.60 / .70
N	lb.	.60 / .70
DOTG (Di-ortho-tolylguanidine)	lb.	.44 / .46
DPG (Diphenylguanidine)	lb.	.35 / .45
El-Sixty	lb.	.50 / .65
Ethylideneaniline	lb.	.42 / .43
Ethyl Zimate	lb.	2.65
Formaldehyde P.A.C.	lb.	.0625
Formaldehydeaniline	lb.	.31
Formaldehyde-para-toluidine	lb.	.52 / .54
Guantal	lb.	.40 / .50
Hepteen	lb.	.35 / .40
Base	lb.	1.35 / 1.50
Hexamethylenetetramine U.S.P.	lb.	.39
Technical	lb.	.33
Lead oleate, No. 999	lb.	.13
Witco	lb.	.15
Monex	lb.	2.65
Novex	lb.	
O. N. V.	lb.	1.00 / 1.10
O-X-A-F	lb.	.50 / .55
Ovac	lb.	.50 / .55
Para-nitroso-dimethylaniline	lb.	.85
Pentex	lb.	1.00 / 1.10
Pentex Flour	lb.	.15 / .16
Pip-Pip	lb.	2.50
Pipsolene	lb.	1.55 / 1.85
R-2	lb.	1.40 / 1.80
R-23	lb.	.40
R & H 50-D	lb.	.42 / .43
Rotax	lb.	$0.60 /$0.65
Safex	lb.	1.20 / 1.30
Santocure	lb.	.80 / 1.00
Super-sulphur No. 1	lb.	.50
2	lb.	.18 / .25
Tetrone A	lb.	3.00
Thiocarbanilide	lb.	.24 / .30
Thionex	lb.	2.65
Trimene	lb.	.55 / .65
Base	lb.	1.05 / 1.20
Triphenylguanidine (TPG)	lb.	.45
Tuads	lb.	2.65
Ureka	lb.	.60 / .75
Blend B	lb.	.60 / .75
C	lb.	.56 / .65
Vulcanex	lb.	.42 / .43
Vulcanol	lb.	.85
Z-B-X	lb.	2.50
Z-88-P	lb.	.31
Zenite	lb.	.46 / .48
A	lb.	.53 / .55
B	lb.	.46 / .48
Zimate	lb.	2.65
Activator		
Aero Ac 50	lb.	
Barak	lb.	.50
Age Resisters		
AgeRite Alba	lb.	1.50 / 2.00
Exel	lb.	1.00 / 1.40
Gel	lb.	.57 / .75
Hipar	lb.	.65 / .92
Powder	lb.	.52 / .65
Resin	lb.	.52 / .65
D	lb.	.52 / .65
White	lb.	1.25 / 1.65
Akroflex C	lb.	.56 / .58
Albasan	lb.	.70 / .75
Aminox	lb.	.52 / .61
Antox	lb.	.56
B-L-E	lb.	.52 / .61
Powder	lb.	.65 / .74
B-X-A	lb.	.55 / .61
Copper Inhibitor X-872	lb.	1.15
Flectol B	lb.	.52 / .65
H	lb.	.52 / .65
White	lb.	.90 / 1.15
M-U-F	lb.	1.50
Neozone (standard)	lb.	.63
A	lb.	.52 / .54
B	lb.	.63
C	lb.	.52 / .54
D	lb.	.52 / .54
E	lb.	.63
Oxynone	lb.	.64 / .80
Parazone	lb.	.68
Permalux	lb.	1.20
Santoflex B	lb.	.52 / .65
Solux	lb.	1.30
Thermoflex A	lb.	.65 / .67
V-G-B	lb.	.52 / .61
Alkalies		
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	2.70 / 3.55
liquid, 50%	100 lbs.	1.95
solid (700 lb. drums)	100 lbs.	2.30 / 3.15
Antiscorch Materials		
A-F-B	lb.	$0.35 /$0.40
Antiscorch T	lb.	.90
E-S-E-N	lb.	.35 / .40
R-17 Resin (drums)	lb.	.10
RM	lb.	1.25
Retarder W	lb.	.36
U.T.B.	lb.	.35 / .40
Antisun Materials		
Heliozone	lb.	.23
Sunproof	lb.	.23 / .25
Colors		
BLACK		
Du Pont powder	lb.	.42 / .44
Lampblack (commercial)	lb.	.15
BLUE		
Brilliant	lb.	
Du Pont dispersed	lb.	.83 / 3.60
Powders	lb.	2.25 / 3.75
Prussian	lb.	.0375
Toners	lb.	.08 / 3.85
BROWN		
Mapico	lb.	.11
GREEN		
Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	.22
oxide (freight allowed)	lb.	
Dark	lb.	
Du Pont dispersed	lb.	.98 / 1.75
Powders	lb.	1.00 / 2.00
Guignet's, Easton, Pa., bbls.	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.75
ORANGE		
Du Pont dispersed	lb.	.88 / .90
Powders	lb.	.80 / 2.50
Lake	lb.	
Toners	lb.	.40 / 1.60
ORCHID		
Toners	lb.	1.50 / 2.00
PINK		
Toners	lb	1.50 / 2.00
PURPLE		
Permanent	lb.	
Toners	lb.	.60 / 2.10
RED		
Antimony		
Crimson, 15/17%	lb.	.45
R. M. P. No. 3	lb.	.48
Sulphur free	lb.	.50
R.M.P.	lb.	.52
Golden 15/17%	lb.	.28
Z-A	lb.	.37
Z-2	lb.	.23
Aristi	lb.	1.75
Cadmium, light (400 lb. bbls.)	lb.	.70 / .75
Chinese	lb.	
Crimson	lb.	
Du Pont dispersed	lb.	.93 / 2.05
Powders	lb.	.52 / 1.05
Mapico	lb.	.0925
Medium	lb.	

Rub-Er-Red, Easton, Pa., bbls. ..... lb. $0.0925
Scarlet ..... lb.
Toners ..... lb. .08 /$2.00

WHITE

Lithopone (bags) ..... lb. .04⅛/ .04⅜
Albalith Black Label-11 ... lb. .04⅛/ .04⅜
Astrolith ..... lb. .04⅛/ .04⅜
Azolith ..... lb. .04⅛/ .04⅜
Cryptone-BA-19 ..... lb. .05⅝/ .05⅞
BT ..... lb. .05⅝/ .05⅞
CB ..... lb. .05⅝/ .05⅞
ZS No. 20 ..... lb. .07⅜/ .08⅛
86 ..... lb. .07⅜/ .08⅛
230 ..... lb. .07⅜/ .08⅛
Sunolith ..... lb. .04⅛/ .04⅜
Ray-Bar ..... lb. .05⅝/ .06⅜
Ray-Cal ..... lb. .05⅝/ .06⅜
Rayox ..... lb. .14 / .17
Titanolith (5-ton lots) .... lb. .05⅝/ .05⅞
Titanox-A (50-lb. bags) .... lb. .14 / .14¾
B (50-lb. bags) ..... lb. .05⅝/ .05⅞
30 (50-lb. bags) ..... lb. .05⅝/ .05⅞
C (50-lb. bags) ..... lb. .05⅝/ .05⅞
M ..... lb. .05⅝/ .05⅞
Ti-Tone ..... lb.
Zinc Oxide
Azo ZZZ-11 ..... lb. .0625/ .065
44 ..... lb. .0625/ .065
55 ..... lb. .0625/ .065
66 ..... lb. .0625/ .065
French Process, Florence
White Seal-7 (bbls.) ... lb. .085 / .0875
Green Seal-8 ..... lb. .08 / .0825
Red Seal-9 ..... lb. .075 / .0775
Kadox, Black Label-15 ... lb. .065 / .0675
No. 25 ..... lb. .075 / .0775
Red Label-17 ..... lb. .065 / .0675
Horse Head Special 3 ... lb. .0625/ .065
XX Red-4 ..... lb. .0625/ .065
23 ..... lb. .0625/ .065
72 ..... lb. .0625/ .065
78 ..... lb. .0625/ .065
80 ..... lb. .0625/ .065
103 ..... lb. .0625/ .065
110 ..... lb. .0625/ .065
St. Joe (lead free)
Black Label ..... lb. .0625/ .065
Green Label ..... lb. .0625/ .065
Red Label ..... lb. .0625/ .065
U.S.P. ..... lb. .095 / .0975
White Jack ..... lb. .07⅞/ .08⅛
Zopaque ..... lb. .14 / .1475

YELLOW

Cadmolith (cadmium yellow), 400 lb. bbls. ..... lb. .45 / .50
Du Pont dispersed ..... lb. 1.25 / 1.75
Powders ..... lb. 1.55 / 1.37
Lemon ..... lb.
Mapico ..... lb. .0675
Toners ..... lb. 2.50

Dispersing Agents

Darvan ..... lb. .30 / .47
Nevoll (drums) ..... lb. .0215
Santomerse S ..... lb. .11 / .25

Fillers, Inert

Asbestine, c.l., f.o.b., mills. ton 15.00
Barytes ..... ton 30.00 /36.00
f.o.b., St. Louis (50 lb. paper bags) ..... ton 22.85
off color, domestic ..... ton 20.00 /25.00
white, imported ..... ton 29.00 /32.00
Blanc fixe, dry, precip. .... lb. .03 / .035
Calcene ..... ton 37.50 /43.00
Infusorial earth ..... lb. .02 / .03
Kalite No. 1 ..... ton 24.00 /50.00
3 ..... ton 34.00 /60.00
Magnesia, calcined, heavy .. lb. .04
Carbonate, l.c.l. ..... lb. .07 / .095
Pyrax A ..... ton 6.50 /20.00
Whiting
Columbia Filler ..... ton 9.00 /14.00
Guilders ..... 100 lbs.
Hakuenka ..... lb.
Paris white, English cliff-stone ..... 100 lbs.
Southwark Brand, Commercial ..... 100 lbs.
All other grades ... 100 lbs.
Suprex, white extra light . ton 45.00 /60.00
heavy ..... ton 45.00 / 60.00
Witco, c.l. ..... ton 6.00

Finishes

Rubber lacquer, clear ..... gal.
colored ..... gal.
Starch, corn, pwd. .... 100 lbs.
potato ..... lb.
Talc ..... ton 25.00 /45.00

Flock

Cotton flock, dark ..... lb. .105 / .13
dyed ..... lb. .45 / .85
white ..... lb. .12 / .18
Rayon flock, colored ..... lb. 1.10 / 1.50
white ..... lb. .90

Latex Compounding Ingredients

Accelerator 85 .. .. lb. .35
RG ..... lb. 1.40
122 ..... lb. 1.55
552 ..... lb. 2.50
Aerosol ..... lb. $0.45
Antox, Dispersed ..... lb. .42
Aquarex A ..... lb. .35
D ..... lb. .75
F ..... lb. .85
WA Paste ..... lb. .25
Areskap No. 50 ..... lb. .18 /$0.24
100, dry ..... lb. .39 / .51
Aresket No. 240 ..... lb. .16 / .22
300, dry ..... lb. .42 / .50
Aresklene No. 375 ..... lb. .35 / .50
400, dry ..... lb. .51 / .65
Black No. 25, Dispersed ... lb. .22 / .40
Catalpo ..... ton
Collocarb ..... lb. .055 / .07
Color Pastes, Dispersed .... lb. .35 / 1.90
Dispersex No. 15 ..... lb. .11 / .12
No. 20 ..... lb. .08 / .10
Emo, brown ..... lb. .15
white ..... lb. .15
Factice Compound, Dispersed ..... lb. .36
Heliozone, Dispersed ..... lb. .25
Igepon A ..... lb.
MICRONEX, Colloidal .... lb. .055 / .07
Nekal BX (dry) ..... lb.
Palmol ..... lb. .11
Pipsol X ..... lb. 3.05 / 3.55
R-23 ..... lb. .57
RN-2 ..... lb. 1.40 / 1.80
S.1 (400 lb. drums) ..... lb. .65
Santomerse D ..... lb. .41 / .65
S ..... lb. .11 / .25
No. 1 ..... lb. .18 / .35
No. 2 ..... lb. .18 / .35
No. 3 ..... lb. .40 / .65
No. 3P ..... lb. .29 / .45
Santovar A ..... lb. 1.15 / 1.40
Stablex A ..... lb. .90 / 1.10
B ..... lb. .65 / .90
C ..... lb. .40 / .50
Sulphur, Dispersed ..... lb. .10 / .15
No. 2 ..... lb. .075 / .15
T.1. (400 lb. drums) ..... lb. .40
Tepidone ..... lb. 1.55
Vulcan Colors ..... lb.
Zinc oxide, Dispersed ..... lb. .12 / .15

Mineral Rubber

Black Diamond ..... ton 25.00
Hydrocarbon, hard ..... ton 22.00 /42.00
Parmr ..... ton 22.00 /24.00
Pioneer ..... ton
285°-300° ..... ton 22.00 /42.00

Mold Lubricants

Mold Paste ..... lb. .12 / .18
Sericite ..... ton 65.00 /75.00
Soapbark ..... lb.
Soapstone ..... ton 25.00 /35.00

Oil Resistant

AXF ..... lb. .40 / .50

Reenforcers

Carbon Black
Aerfloted Arrow Specification Black ..... lb. .0275/ .0625
Arrow Compact Granulized Carbon Black ..... lb. .0275/ .0625
"Certified" Heavy Compressed, Cabot ..... lb.
Spheron ..... lb.
Carbitum ..... ton 58.00 /63.00
Continental Dustless, c.l. .. lb. .0275/ .0375
Compressed c.l. ..... lb. .0275/ .0375
Uncompressed, c.l. .... lb. .0275/ .0375
Disperso, c.l. .. .. lb. .0275/ .0375
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered ..... lb. .0625
Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered ..... lb. .0625
Dixiedensed, 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ..... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered ..... lb. .0625
Excello, c.l., f.o.b Gulf ports ..... 100 lbs. 2.75 / 4.75
delivered New York. 100 lbs. 3.75 / 5.75
l.c.l., delivered New York ..... 100 lbs. 6.25 / 7.00
Fumonex, c.l., f.o.b. works. lb. .03
ex-warehouse ..... lb. .05
Gastex ..... lb. .03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered ..... lb. .0625
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ..... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered ..... lb. $0.0625
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered ..... lb. .0625
MICRONEX Beads, c.l., f.o.b. Gulf ports ... lb. .0275
c.l., delivered, New York ..... lb. .0375
local stock, bags, delivered ..... lb. .0625
Mark II, c.l., f.o.b. Gulf ports ..... lb. .0275
c.l., delivered, New York ..... lb. .0375
local stock, bags, delivered ..... lb. .0625
Standard, c.l., f.o.b. Gulf ports ..... lb. .0275
c.l., delivered, New York ..... lb. .0375
local stock, bags, delivered ..... lb. .0625
W-5, c.l., f.o.b., Gulf ports ..... lb. .0275
c.l., delivered, New York ..... lb. .0375
local stock, bags, delivered ..... lb. .0625
W-6, c.l., f.o.b., Gulf ports ..... lb. .0275
c.l., delivered, New York ..... lb. .0375
local stock, bags, delivered ..... lb. .0625
Paradene No. 2 (drums). lb. .04
Pelletex ..... lb. .03 /$0.07
Supreme, c.l., f.o.b. Gulf ports ..... 100 lbs. 2.75 / 4.75
delivered New York. 100 lbs. 3.75 / 5.75
l.c.l., delivered New York ..... 100 lbs. 6.25 / 7.00
"WYEX BLACK" ..... lb. .0275/ .0625

Clays

Aerfloted Paragon (50 lb. bags) ..... ton 9.50 /22.00
Suprex (50 lb. bags) .. ton 9.50 /22.00
China ..... ton 17.50 /20.00
Crown, f.o.b. (plant) ... ton 9.50
Dixie ..... ton 11.00 /26.00
Junior ..... ton 9.50 /24.00
Hi-White, f.o.b. Huber Ga. ..... ton 9.50
McNamee ..... ton 9.50 /22.00
Par ..... ton 9.50 /22.00
Witco, f.o.b. works ..... ton 9.50
P-33 ..... lb. .0475/ .0775
Thermax ..... lb. .0175/ .05
Velvetex ..... lb. .022 / .035

Reodorants

Amora A ..... lb.
B ..... lb.
C ..... lb.
D ..... lb.
Curodex 19 ..... lb. 2.75
188 ..... lb. 3.50
198 ..... lb. 4.50
Rodo No. 0 ..... lb. 3.50 / 4.00
10 ..... lb. 4.50 / 5.00

Rubber Substitutes

Black ..... lb. .07 / .11
Brown ..... lb. .07 / .10
White ..... lb. .08 / .11½
Factice
Amberex ..... lb. .19
Brown ..... lb. .07 / .10
Fac-Cel B ..... lb. .12
C ..... lb. .12
Neophax A ..... lb. .0975
B ..... lb. .0975
White ..... lb. .08 / .11

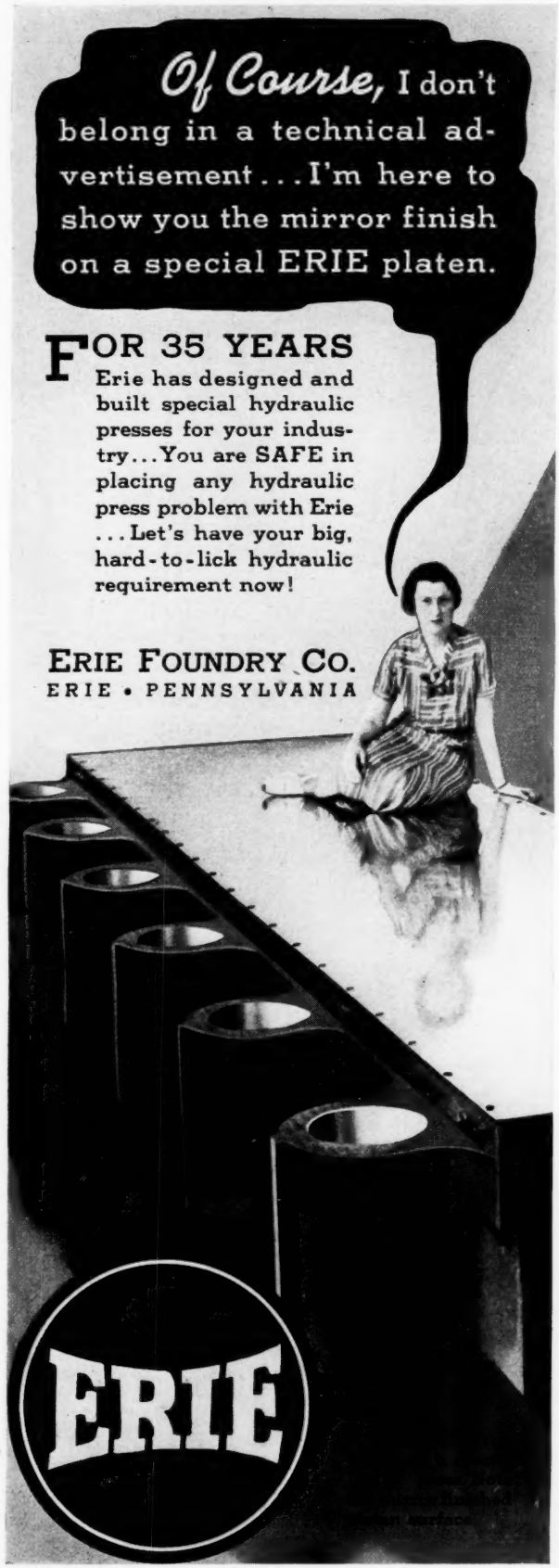
Softeners

Bondogen ..... lb. .98 / 1.50
Burgundy pitch ..... lb. .06
Cycline oil ..... gal. .14 / .20
Nuba resinous pitch (drums) Grades No. 1 and No. 2. lb. .0265
Nubalene Resin ..... lb. .025
Palm oil (Witco), c.l. ..... lb. .0575
Pine tar ..... gal.
Plastogen ..... lb. .0775/ .12
R-19 Resin (drums) ..... lb. .10
R-21 Resin (drums) ..... lb. .10
Reogen ..... lb. .115 / .26
Rosin oil, compounded ... gal. .40
RPA No. 1 ..... lb. .65
2 ..... lb. .65
3 ..... lb. .46
Rubtack ..... lb. .10
Tackol ..... lb. .085 / .18
Tonox ..... lb. .52 / .61
Tonox D ..... lb. .75 / .85
Witco No. 20 ..... gal. .20
X-1 Resinous oil (tank car). lb. .019

Solvents

Beta-Trichlorethane ..... gal.
Carbon bisulphide ..... lb.
tetrachloride ..... lb.

(Continued on page 72)


Of Course, I don't belong in a technical advertisement . . . I'm here to show you the mirror finish on a special ERIE platen.
FOR 35 YEARS
Erie has designed and built special hydraulic presses for your industry . . . You are SAFE in placing any hydraulic press problem with Erie . . . Let's have your big, hard-to-lick hydraulic requirement now!
ERIE FOUNDRY CO.
ERIE • PENNSYLVANIA
ERIE

Regular and Special Constructions
of
COTTON FABRICS

Single Filling Double Filling
and
ARMY
Ducks

HOSE and BELTING
Ducks

Drills

Selected
Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

COTTON AND FABRICS

New York Quotations

April 24, 1939

Drills

38-inch 2.00-yard	yd.	$0.10¼
40-inch 3.47-yard		.06½
50-inch 1.52-yard		.15⅛
52-inch 1.85-yard		.12¼
52-inch 1.90-yard		**.11¾**
52-inch 2.20-yard		.10¼
52-inch 2.50-yard		.09
59-inch 1.85-yard		.11½

Ducks

38-inch 2.00-yard D.F.	yd.	.10 /.10¼
40-inch 1.45-yard S. F.		.15¼
51½-inch 1.35-yard D. F.		.14⅞
72-inch 1.05-yard D. F.		.21
72-inch 17.21-ounce		.23¾
Mechanicals		
Hose and belting	lb.	.24
Tennis		
52-inch 1.35-yard	yd.	.16⅛

Hollands

Gold Seal and Eagle		
20-inch No. 72	yd.	.09
30-inch No. 72		.16
40-inch No. 72		.18
Red Seal and Cardinal		
20-inch	yd.	.07½
30-inch		.13¾
40-inch		.15
50-inch		.24

Osnaburgs

40-inch 2.34-yard	yd.	.09
40-inch 2.48-yard		.08¾
40-inch 2.56-yard		.07½
40-inch 3.00-yard		.07¼
40-inch 7-ounce part waste		.07
40-inch 10-ounce part waste		.10
37-inch 2.42-yard		.08⅞

Raincoat Fabrics

Cotton		
Bombazine 60 x 64	yd.	.06⅞
Plaids 60 x 48		.09¾
Surface prints 60 x 64		.10½
Print cloth, 38½-inch, 60 x 64		.04⅛
Sheetings, 40-Inch		
48 x 48, 2.50-yard	yd.	.06¾
64 x 68, 3.15-yard		.06½
56 x 60, 3.60-yard		.05½
44 x 40, 4.25-yard		.04¾
Sheetings, 36-Inch		
48 x 48, 5.00-yard	yd.	.04
44 x 40, 6.15-yard		.03½

Tire Fabrics

Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.27
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.27
9¾ ounce 60" 10/2 ply Karded peeler	lb.	.26
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.27½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.25½
23/5/3 Karded peeler, 1¼" cotton	lb.	.33
23/5/3 Combed Egyptian	lb.	.46½
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.29

Rubber and Canvas Footwear Production Statistics

Thousands of Pairs

	Inventory	Production	Shipments
1937	20,430	74,102	67,191
1938	16,183	50,812	54,942
1939			
Jan.	16,157	4,807	4,778
Feb.	16,582	4,953	4,629

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

New York Cotton Exchange Week-End Closing Prices

Futures	Feb. 25	Mar. 25	Apr. 1	Apr. 8	Apr. 15	Apr. 22
Mar.	8.55	....	....	....	....	....
Apr.	8.36	8.17	8.16	7.98	....	....
May	....	....	8.06	7.98	7.94	8.13
July	7.91	7.93	7.84	7.80	7.69	7.90
Sept.	7.51	7.58	7.65	7.51	7.36	7.50
Dec.	7.44	7.52	7.50	7.45	7.36	7.45
Feb.	....	....	7.53	7.54	7.48	7.39	7.48
Mar.	....	....	....	7.57	7.54	7.42	7.51

THE accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures covering the past two months.

The New York spot middling price closed at 8.45¢ per pound on April 1.

The price eased off during the first half of the month, closing at 8.32¢ on April 14, but recovering to 8.57¢ on April 19. The closing price on April 26 was 8.38¢ per pound.

Sales at 13 southern markets totaled 43,715 bales during 11 days since April 1, against 53,560 bales for the same days one year ago.

Consumption of all cotton in domestic mills during March totaled 649,237 bales, against 562,293 in February and 512,626 in March, 1938.

Exports of cotton from the United States in February totaled 264,000 bales, value $13,488,000, compared with 290,000 bales, value $14,719,000, in January, 1939, and 399,000 bales, value $20,732,000, in February, 1938, according to the Bureau of Foreign and Domestic Commerce. Total exports for August through February aggregated 2,456,000 bales, against 4,231,000 bales for the same period of 1937-38.

Plans for reducing the large stocks of cotton in government loan continued to be discussed, with Secretary of Agriculture Wallace still favoring some form of export subsidy.

Fabrics

The market for cotton textiles of coarse yarn construction continued generally quiet until the latter part of April when activity was renewed to some extent. If the recent trend holds, a firmer market is anticipated. Demand has been originating chiefly in the covering of nearby commitments with buyers, reflecting general business sentiment, hesitant about placing orders beyond 30 days ahead. Women's and children's raincoats with black and white checks are reported to be selling very well at present. Women's raincoats with World's Fair patterns are also in demand, and this business is expected to increase as the New York World's Fair progresses.

The market was irregular, with drills, ducks, osnaburgs, and raincoat fabrics somewhat easier in price, and tire fabrics, sheetings, and hollands steady at last month's levels.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for March, 1939:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham.

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	5,286	492
United States	19,702	683
Continent of Europe	8,577	292
British possessions	3,979	54
Japan	2,955	25
Other countries	1,194	20
Totals	41,693	1,566

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	5,312	30
Dutch Borneo	708	..
Java and other Dutch islands	346	..
Sarawak	1,228	3
British Borneo	154	7
Burma	423	..
Siam	3,608	1,308
French Indo-China	685	155
Other countries	68	..
Totals	12,532	1,503

New York Quotations

(*Continued from page* 70)

Solvents (*Cont'd*)

Industrial 90% benzol (tank car)	gal.	$0.16
Skellysolve	gal.	

Stabilizers for Cure

Laurex, ton lots	lb.	.12	/$0.14
Stearex B	lb.	.10	/ .11
Beads	lb.	.09	/ .10
Stearic acid, single pressed	lb.	.10	/ .11
Stearite	100 lbs.	.09	
Zinc stearate	lb.	.23	

Synthetic Rubber

Neoprene Type E	lb.	.63
G	lb.	.70
GW	lb.	.75
H	lb.	.78
M	lb.	.65
Latex Type 57	lb.	.30

Varnish

Shoe	gal.	1.45

Vulcanizing Ingredients

Sulphur		
Chloride, drums	lb.	.035 / .04
Rubber	100 lbs.	2.65
Telloy	lb.	1.75
Vandex	lb.	1.75
(See also Colors—Antimony)		

Waxes

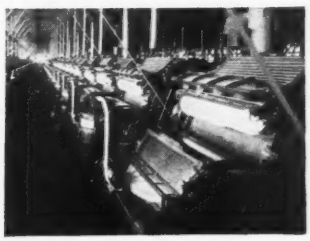
Carnauba, No. 3 chalky	lb.	.37½
2 N.C.	lb.	.39¼
3 N.C.	lb.	.37½
1 Yellow	lb.	.4575
2	lb.	.4425
Montan, crude	lb.	.11

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1937	51,934,040	10,213,670
1938	26,606,048	4,147,318
1939		
Jan.	3,589,452	$99,927
Feb.	3,844,996	657,565

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

HOW COTTON FABRICS ARE MADE . . .

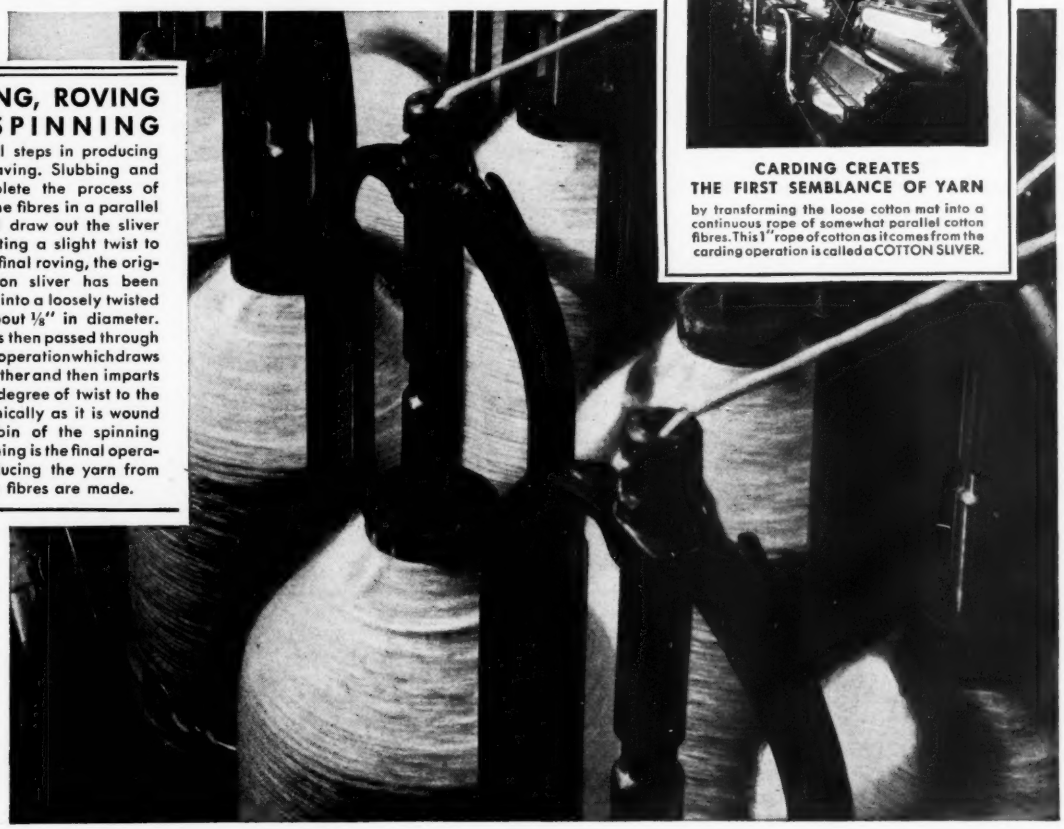


CARDING CREATES THE FIRST SEMBLANCE OF YARN

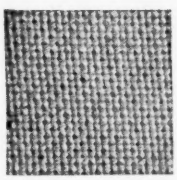
by transforming the loose cotton mat into a continuous rope of somewhat parallel cotton fibres. This 1" rope of cotton as it comes from the carding operation is called a COTTON SLIVER.

SLUBBING, ROVING AND SPINNING

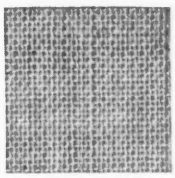
are the final steps in producing yarn for weaving. Slubbing and roving complete the process of arranging the fibres in a parallel position and draw out the sliver while imparting a slight twist to it. After the final roving, the original 1" cotton sliver has been transformed into a loosely twisted "Roving" about ⅛" in diameter. This Roving is then passed through the spinning operation which draws it out still further and then imparts the desired degree of twist to the yarn mechanically as it is wound on the bobbin of the spinning frame. Spinning is the final operation in producing the yarn from which cotton fibres are made.



GOOD RUBBER FABRICS HAVE TO START WITH THE PROPER YARN



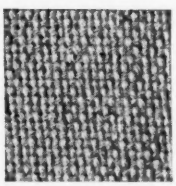
Shawmut Chafer Fabric



West Point Osnaburg

Through complete control over the conversion of raw cotton into the finished yarn used in weaving our rubber fabrics, we are able to produce fabrics that are made to meet the needs of your particular product from the ground up. Whether it's fabrics for belts, hose, tires or boots, we are in a position to offer rubber manufacturers complete textile research, engineering and manufacturing facilities.

Our representative will gladly call at your request.



Shawmut Hose Duck

Columbus Sheeting

Shawmut Belting Duck

WELLINGTON SEARS COMPANY

65 WORTH STREET, NEW YORK, N. Y.

Book Reviews

(*Continued from page* 64)

those who know how to get themselves across. This knack of making ourselves important is an acquired ability, according to Mr. Mangan, and one that can be easily learned. He advances the theory that we should become a nation of salesmen, selling living merchandise —ourselves.

"Foreign Commerce and Navigation of the United States for the Calendar Year 1937." United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. 1939. Cloth, 9 by 11½ inches, 836 pages. Indexed. Price $2.25. For sale by the Superintendent of Documents, Washington, D. C.

This annual report of the foreign commerce and navigation of the U. S. presents detailed statistical tables for 1937 on imports and exports by articles, countries, and customs districts. The book also contains summary tables which compare 1937 with previous years. Detailed figures on imports and exports of rubber and rubber manufactures and the exports of rubber compounding materials are included.

"Motor Fuel Taxation in the United States." Finla Goff Crawford, Ph.D., Syracuse University, Syracuse, N. Y. Cloth, 122 pages. Tables. Price $1.

This biennial report provides a factual all-inclusive treatment of motor fuel taxation in this country from its inception to the present. Detailed chapters on federal, state, and municipal gasoline taxation treat of diversion, evasion, administration, and distribution of such tax receipts. Also covered are Diesel fuel taxation, inspection fees, and alcohol-gasoline. Tables facilitate geographic and chronologic comparisons.

U. S. Crude and Waste Rubber Imports for 1939

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1939	Totals 1938	Balata	Miscellaneous	Waste
Jan. .....*tons*	36,672	1,521	560	56	9	264	39,082	42,135	61	803	328
Feb.	34,185	1,463	239	348	3	252	36,490	43,930	45	685	54
Mar.	36,434	1,885	229	208	4	229	38,989	35,967	33	649	29
Total 3 mos., 1939 .....*tons*	107,291	4,869	1,028	612	16	745	114,561	.....	139	2,137	411
Total 3 mos., 1938 .....*tons*	115,705	3,520	1,235	605	6	961	.....	122,032	113	1,889	123

Compiled from The Rubber Manufacturers Association, Inc., statistics.

Tire Production Statistics

	Pneumatic Casings Inventory	Production	Shipments
1937	10,383,235	53,309,973	53,485,388
1938	8,451,390	40,182,392	42,330,072
1939			
Jan.	8,932,245	4,581,380	4,163,005
Feb.	9,572,553	4,343,513	3,738,696
Mar.	10,108,584	5,137,030	4,582,655

	Pneumatic Casings Original Equipment	Replacement Sales	Export Sales
1937	22,352,601	29,886,326	1,246,461
1938	10,716,130	30,565,008	1,048,934
1939			
Jan.	1,685,190	2,353,822	123,993
Feb.	1,472,356	2,159,901	106,439
Mar.	1,746,999	2,719,450	116,206

	Inner Tubes Inventory	Production	Shipments
1937	10,311,745	52,373,330	52,766,728
1938	8,165,696	37,847,656	40,292,614
1939			
Jan.	8,068,700	4,097,759	3,935,652
Feb.	8,414,652	3,680,521	3,334,791
Mar.	8,900,944	4,470,184	4,015,333

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.†	Australia	Belgium	Canada	Czecho-Slovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1936	475,500	62,700	14,400	9,600	27,900	8,800	56,800	71,800	16,000	61,700	31,000	65,100	831,800
1937	592,500	137,300	19,300	15,000	36,100	13,000	60,000	98,200	24,000	62,200	30,400	77,400	1,120,500
1938	406,330	169,201	12,309	11,310	25,696	9,936	58,144	90,200	28,170	46,307	25,649*	83,127	930,256
1938													
Jan.	45,595	17,811	617	1,258	1,789	1,102	4,780	6,314	1,809	4,935	693	6,264	90,614
Feb.	40,976	19,149	621	974	615	1,771	5,420	6,959	2,000	3,173	2,341	5,958	87,313
Mar.	42,074	18,134	1,084	961	2,123	1,323	4,823	10,768	1,365	6,222	2,162	6,332	95,149
Apr.	31,869	16,572	647	904	999	920	5,721	6,497	2,397	5,456	4,281	6,220	80,564
May	27,808	17,783	1,087	1,137	2,545	957	5,249	9,595	2,422	3,328	4,163	7,290	80,256
June	26,428	15,314	825	853	3,243	988	4,552	7,478	2,399	2,156	504	7,109	70,588
July	22,208	13,555	1,251	1,106	2,685	636	4,543	6,927	3,641	3,100	541	6,623	65,938
Aug.	31,492	14,925	1,444	1,238	1,832	595	3,560	7,190	2,078	2,034	739	6,106	71,199
Sept.	34,435	11,218	1,588	519	1,405	608	5,072	7,390	1,799	3,586	1,725	7,116	73,343
Oct.	33,829	7,632	1,800	848	3,139	9	3,804	6,326	3,921	3,206	2,000*	10,767	72,733
Nov.	32,566	8,657	671	636	3,123	379	5,226	7,275	1,984	4,665	4,000*	7,130	68,591
Dec.	37,050	8,451	674	876	2,198	648	5,394	7,481	2,355	4,446	2,500*	6,212	73,968
1939													
Jan.	36,614	7,121	954	898	2,867	1,131	4,694	7,227	2,133	2,553	4,000*	6,593	70,478

*Estimated. †U. K. figures show gross imports, not net imports. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Liberia†	Other Africa	South America	Mexican Guayule	Grand Total
1936.....	353,700	309,600	49,700	8,600	5,800	8,200	21,000	34,600	40,800	832,000	1,600*	1,600	4,500	14,700	1,300	855,700
1937.....	469,900	431,700	70,400	9,800	7,200	13,200	25,900	35,600	43,400	1,107,100	1,600*	2,200	5,500	16,300	3,400	1,136,100
1938.....	372,046	298,112	49,528	8,451	6,737	9,512	17,792	41,618	58,518	862,314	1,971*	2,929	4,941	15,337	3,231	890,723
1938																
Jan.	30,998	26,468	5,222	841	538	1,307	3,485	2,897	6,088	77,844	138	501	415	938	586	80,422
Feb.	37,166	27,327	5,216	639	770	918	8	3,266	3,070	78,380	125	168	438	1,640	298	81,049
Mar.	33,567	31,270	3,834	532	703	853	1,564	2,837	3,213	78,373	159	108	501	1,883	240	81,264
Apr.	44,744	28,489	1,951	485	842	1,158	1,728	1,583	3,647	84,627	201	308	318	1,085	224	86,763
May	28,011	22,039	2,833	909	561	815	1,648	2,507	3,118	62,411	120	175	284	1,160	281	64,461
June	28,048	24,427	3,693	625	693	643	2,441	3,904	4,776	69,250	198	110	353	809	245	70,965
July	25,055	35,142	3,861	601	482	937	2 057	4,710	5,139	77,984	126	311	371	722	266	79,780
Aug.	33,618	23,057	4,401	647	306	728	965	4,793	3,840	72,355	204	125	525	1,118	326	74,653
Sept.	30,485	20,207	3,990	824	212	284	756	3,893	8,139	68,790	208	445	453	828	260	70,984
Oct.	25,788	29,883	4,893	832	279	1,075	1,612	4,976	3,638	72,976	128	222	460	1,650	176	75,612
Nov.	29,214	19,195	6,422	670	601	567	929	3,223	4,035	64,856	164	274	433	1,229	92	67,048
Dec.	25,352	10,608	3,212	846	750	227	599	3,029	9,815	54,438	200	182	390	2,275	237	57,722
1939																
Jan.	24,393	38,669	7,237	764	1,115	1,604	2,342	2,918	4,739	83,781	220	528	492	1,812	281	87,114
Feb.	29,278	25,000	5,323	956	618	664	1,484	5,606	5,659	74,588	200*	250*	400*	1,187	250*	76,875

*Estimated. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

LATEX CHEMIST, PRODUCTION, RESEARCH, DIPPING, COATing, formulating, and developing new products. Address Box No. 1082, care of INDIA RUBBER WORLD.

SALESMAN—DESIRES CONNECTION WITH RUBBER MANUfacturer to supply mechanicals—molded, extruded, and sponge—to Automobile and Body Manufacturers in Detroit and vicinity. Nine years' sales experience in this territory. Address Box No. 1084, care of INDIA RUBBER WORLD.

RUBBER ENGINEER DESIRES CHANGE OF POSITION. NINEteen years of broad experience in the manufacture of mechanical, sponge and synthetic rubber goods. Capable as superintendent, technical superintendent, or assistant factory manager. Address Box No. 1085, care of INDIA RUBBER WORLD.

FACTORY MANAGER OR SUPERINTENDENT, 18 YEARS' EXperience in United States and Canada in manufacture of Rubber Heels, Soles, and Molded Goods. Competent to handle Labor and Production Problems and has had Sales Experience. Address Box No. 1086, care of INDIA RUBBER WORLD.

RUBBER COMPOUNDER AND DEVELOPMENT ENGINEER WITH 13 years' experience in mechanical goods. Salary $4,800 per year. Age 38. Address Box No. 1087, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

$2,500 SALARIED POSITION $15,000

OUR SYSTEM OF SEARCHING OUT SALARIED POSITIONS, hiding your identity, increases your salary commensurate with training and experience. For valuable information write Rubber Department, EXECUTIVE'S PROMOTION SERVICE, Washington, D. C.

FOSTER D. SNELL, INC.
Chemists—Engineers
Every form of Chemical Service
305 Washington Street **Brooklyn, N. Y.**

Compounding Ingredients for Rubber
by the Editors of
INDIA RUBBER WORLD
$2.50 Postpaid in U. S. A. $2.75 Elsewhere

Deresinated and Precipitated Surinam
B A L A T A
Refined approximately 99%
Purer and cheaper than you can produce it and you avoid the ever present fire risk. Dependable deliveries. Sample on request.
HUNTINGDON MANUFACTURING CO.
MEADOWBROOK, PA.

COLORS for RUBBER

Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides

Reinforcing Fillers and Inerts

C. K. WILLIAMS & CO.
EASTON, PA.

SITUATIONS OPEN (Continued)

WANTED IMMEDIATELY RUBBER MAT SALESMAN. SUBSTANtial commission only. Product has many new selling features. Also manufactures patches. Write immediately for full particulars advising experience. Address Box No. 1081, care of INDIA RUBBER WORLD.

CHEMIST ABOUT 28 YEARS OLD, WITH KNOWLEDGE OF NONcuring rubber cement, compounding rubber heels and soles. State age, education, experience and salary expected. Opportunity for advancement. Address Box No. 1088, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

RUBBER FACTORY IN MARYLAND WILL MAKE MOLDED RUBber articles for you. Address Box No. 1080, care of INDIA RUBBER WORLD.

FOR SALE: CONCRETE STEEL FULLY EQUIPPED TIRE plant, also suitable for mechanical goods. Experienced labor available. Address Box No. 1083, care of INDIA RUBBER WORLD.

—AGENCY WANTED—
Business established fifteen years on Pacific Coast desires to acquire agency for West Coast covering items used by the Rubber Industry. Address The Desser Tire & Rubber Company, Huntington Park, Calif.

RUBBER IMPROVEMENT, LTD., LEONEX WORKS, HYTHE RD., Willesden, London, N.W.10, Manufacturers of Reclaimed Rubber, invites communication from Manufacturers of chemicals for the Rubber Trade, having no English Agents already.

CUSTOM MILLING—EXPERT COMPOUNDING AND PROCESSING work for all requirements. The Honey Company, P. O. Box 453, Trenton, N. J.

MECHANICAL
MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

INTERNATIONAL PULP CO.
41 Park Row, NEW YORK, N. Y.
SOLE PRODUCERS
ASBESTINE
REG. U. S. PAT. OFF.

The H. O. Canfield Co.

MANUFACTURE

Molded Specialties, Plumbers' Rubber Goods, Valves, Gaskets, Hose Washers, and Cut Washers of all kinds

Write for prices and samples

Offices and Works Bridgeport, Conn.
Chicago Office: 424 North Wood Street

(*Advertisements continued on page 77*)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	February, 1939		Two Months Ended February, 1939	
UNMANUFACTURED—*Free*	Quantity	Value	Quantity	Value
Liquid latex (solids)....*lb.*	3,844,996	$657,565	7,434,448	$1,257,492
Jelutong or pontianak....*lb.*	1,142,590	129,726	3,029,983	333,479
Balata ....*lb.*	34,631	4,426	170,690	24,843
Gutta percha ....*lb.*	389,445	45,977	589,614	77,366
Guayule ....*lb.*	474,300	46,576	979,400	96,156
Scrap and reclaimed....*lb.*	595,523	11,009	999,269	17,125
Totals	6,481,485	$895,279	13,203,404	$1,806,461
Misc. rubber (above), 1,000 *lbs.*	6,481	$895,279	13,203	$1,806,461
Crude rubber....1,000 *lbs.*	65,205	10,269,224	144,175	22,582,230
Totals ....1,000 *lbs.*	71,686	$11,164,503	157,378	$24,388,691
Chicle, crude ....*lb.*	2,059,266	$774,115	4,746,768	$1,502,207
MANUFACTURED—*Dutiable*				
Rubber tires....*no.*	474	$1,407	2,887	$5,009
Rubber boots, shoes, and overshoes ....*prs.*	626	341	1,406	545
Rubber soled footwear with fabric uppers ....*prs.*	39,108	8,866	106,165	15,413
Golf balls ....*no.*	6,624	889	11,328	1,764
Lawn tennis balls....*no.*	146,940	12,153	204,156	17,254
Other rubber balls ....*no.*	194,110	6,650	603,066	24,415
Other rubber toys....*lb.*	42,431	6,858	73,864	11,995
Hard rubber combs....*no.*	65,883	4,642	111,243	7,996
Other manufactures of hard rubber	.....	1,378	.....	1,564
Friction or insulating tape.*lb.*	12,054	2,518	22,193	6,708
Belts, hose, packing, and insulating material	.....	10,178	.....	20,949
Druggists' sundries of soft rubber	.....	2,828	.....	5,077
Inflatable swimming belts, floats, etc. ....*no.*	70,431	4,432	159,617	9,835
Other rubber and gutta percha manufactures...*lb.*	52,433	15,722	102,947	32,106
Totals	.....	$78,862	.....	$160,630

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber ....*lb.*	1,030,513	$152,113	2,079,405	$317,776
Balata ....*lb.*	2,478	1,411	4,478	1,601
Other rubber, rubber substitutes and scrap....*lb.*	6,539	1,509	56,913	4,074
Rubber manufactures (including toys)	.....	617	.....	1,022
Totals	.....	$155,650	.....	$324,473

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed ....*lb.*	1,412,154	$66,663	3,088,208	$154,331
Scrap ....*lb.*	8,254,436	114,424	15,950,790	212,545
Cements ....*gal.*	32,904	32,706	58,247	56,911
Rubberized auto cloth..*sq. yd.*	11,492	5,859	28,033	13,945
Other rubberized piece goods and hospital sheeting..*sq. yd.*	193,429	74,386	419,771	161,172
Boots ....*prs.*	6,073	14,011	9,006	21,253
Shoes ....*prs.*	12,598	6,414	15,608	9,040
Canvas shoes with rubber soles ....*prs.*	51,276	33,195	77,541	50,797
Soles ....*doz. prs.*	3,783	7,784	5,801	11,700
Heels ....*doz. prs.*	40,013	23,614	79,543	42,848
Soling and top lift sheets.*lb.*	56,752	10,526	131,661	22,877
Gloves and mittens..*doz. prs.*	7,074	16,432	12,299	28,225
Water bottles and fountain syringes ....*no.*	20,344	6,814	32,262	11,086
Other druggists' sundries...	.....	55,030	.....	98,790
Gum rubber clothing....*doz.*	25,012	56,817	53,936	89,160
Balloons ....*gross*	28,360	19,885	49,130	37,852
Toys and balls....	.....	10,362	.....	15,653
Bathing caps ....*doz.*	6,207	11,932	7,983	15,407
Bands ....*lb.*	11,208	4,769	32,013	13,339
Erasers ....*lb.*	17,934	10,817	40,925	23,362
Hard rubber goods				
Electrical battery boxes.*no.*	19,620	12,792	43,048	27,508
Other electrical ....*lb.*	25,786	8,106	51,162	13,829
Combs, finished ....*doz.*	7,903	5,717	13,568	9,381
Other hard rubber goods....	.....	13,737	.....	26,167
Tires				
Truck and bus casings.*no.*	27,873	568,614	44,164	875,945
Other auto casings....*no.*	64,822	701,217	118,183	1,344,208
Tubes, auto ....*no.*	54,325	89,755	117,205	177,721
Other casings and tubes..*no.*	7,402	43,375	13,137	93,467
Solid tires for automobiles and motor trucks....*no.*	38	828	124	3,930
Other solid tires....*lb.*	21,786	4,116	43,144	7,408
Tire sundries and repair materials ....*lb.*	178,425	51,893	278,655	83,517
Rubber and friction tape..*lb.*	58,738	16,490	99,258	30,233
Fan belts for automobiles.*lb.*	47,257	28,079	92,532	54,222
Other rubber and balata belts ....*lb.*	227,899	118,994	461,267	243,978
Garden hose ....*lb.*	74,523	12,989	119,301	21,841
Other hose and tubing....*lb.*	319,147	128,202	701,879	263,653
Packing ....*lb.*	94,872	42,038	186,424	85,663
Mats, matting, flooring, and tiling ....*lb.*	74,087	13,110	207,188	31,172
Thread ....*lb.*	41,710	36,674	78,694	68,305
Gutta percha manufactures.*lb.*	71,564	22,709	97,969	30,702
Other rubber manufactures..	.....	92,439	.....	184,043
Totals	.....	$2,594,314	.....	$4,767,186

Imports by Customs Districts

	—February, 1939— *Crude Rubber		—February, 1938— *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	9,865,167	$1,630,953	5,548,124	$832,551
New York	43,436,896	6,907,467	74,339,789	10,906,139
Philadelphia	860,026	127,655	533,000	72,558
Maryland	1,036,136	147,508	725,123	103,004
Georgia	61,600	9,153	.....	.....
Mobile	91,536	12,643	.....	.....
New Orleans	5,605,980	825,333	4,094,650	706,011
Galveston	44,800	6,664	.....	.....
Los Angeles	8,046,571	1,232,931	6,424,246	959,645
San Francisco....	475,356	73,058	358,440	57,032
Colorado	.....	.....	448,000	79,469
Totals	69,524,068	$10,973,365	92,471,372	$13,716,409

*Crude rubber including latex dry rubber content.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2608	U. S. manufacturer of all-rubber brush for cleaning suede shoes.
2609	Manufacturers of rubber deflectors for nursery seats.
2610	Suppliers of latex to make molds.
2611	Manufacturers of rubber spraying equipment, particularly spraying of rubber on vermiculite.
2612	Supplier of Natco balata resin gum or balata gums.
2613	Dealers in scrap rubber.
2614	Manufacturer of rubber key case known as "Quick Key."
2615	Manufacturer of dental mats.
2616	Supplier of rubber bands 15½ inches long, ¼-inch wide, and 1/16-inch thick.
2617	Manufacturer of Randall Stickney gage.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Export Opportunities

No.	COMMODITY	CITY AND COUNTRY
*828	Sporting goods	Guayaquil, Ecuador
*856	Rubber and composition tile	Stockholm, Sweden
‡861	Synthetic rubber tubing....	Cairo, Egypt
†867	Rubber-coated paper	Linkoping, Sweden
*900	Automobile accessories	Toronto, Canada
*949	Sporting goods, novelties, and toys....	Habana, Cuba
‡965	Dental rubber goods....	Sydney, Australia
‡993	Hard rubber combs and surgical equipment and elastic bandages.....	London, Canada
*997	Rubber printing rolls....	Scheveningen, Netherlands
*1001	Rubber industry chemicals....	Paris, France
*1013	Metal presses to mold rubber goods..	" " ce
*1016	Automobile accessories and parts.....	Cairo, Egypt
*1054	Toys and rubber thread....	Tel-Aviv, Palestine
‡1055	Ink and typewriter erasers....	Stockholm, Sweden
*1072	Tires and tubes....	Tel-Aviv, Palestine
†1082	Toys and novelties....	London, England
†1088	Rubber bands	Lourenco Marques, P.E.A.
†1101	Fountain pens	London, England
†1104	Fountain pens	Amsterdam, Netherlands
‡1122	Automobile accessories and parts.....	Singapore, S. S.
‡1125	Druggists' sundries	Cairo, Egypt
*1134	Girdles	Cairo, Egypt
*1142	Automobile accessories	London, England
*1158	Rubber stamps	Santiago, Chile
†1174	Balloons	London, England
‡1180	Rubber gloves, dipped goods, and druggists' sundries	Cairo, Egypt
¶1202	Toys and novelties	London, England
†1220	Insulated wire and insulating materials	London, England
*1265	Druggists' sundries	Cairo, Egypt
x1299	Druggists' sundries	London, England
*1308	Rubber goods	Alexandria, Egypt
*1314	Physicians' rubber articles....	Tel-Aviv, Palestine
†1323	Rubber goods for 5 and 10¢ store.....	Colombo, Ceylon
†1331	Old or second-rate tires and tire-rebuilding machinery.	London, England
¶1332	Tire-retreading or repair machinery...	Chester, England
*1345	Rubber articles and raw rubber.....	Stambul, Turkey
*1354	Automobile accessories	London, England
*1355	Automobile accessories	Stockholm, Sweden
*1356	Automobile accessories	Malmo, Sweden
*1357	Automobile specialties	Stockholm, Sweden
*1387	Automobile accessories, battery cases, and parts	Thessaloniki, Greece
*1413	Women's rain capes	Dublin, Ireland
*1414	Scrap rubber from crepe sole cuttings	Stambul, Turkey
*1415	Merchandise for 5 and 10¢ stores.....	Brussels, Belgium
*1436	Corsets, roll-ons, and brassieres.....	Oslo, Norway

Import Opportunities

§410	Rubber goods	Warsaw, Poland

*Agency. †Purchase. ‡Purchase and agency. ¶Purchase or agency. §Sale. xExclusive Agency.

§Sale. xExclusive agency.